

MOTOR AGE

Vol. XXVII
No. 16

CHICAGO, APRIL 22, 1915

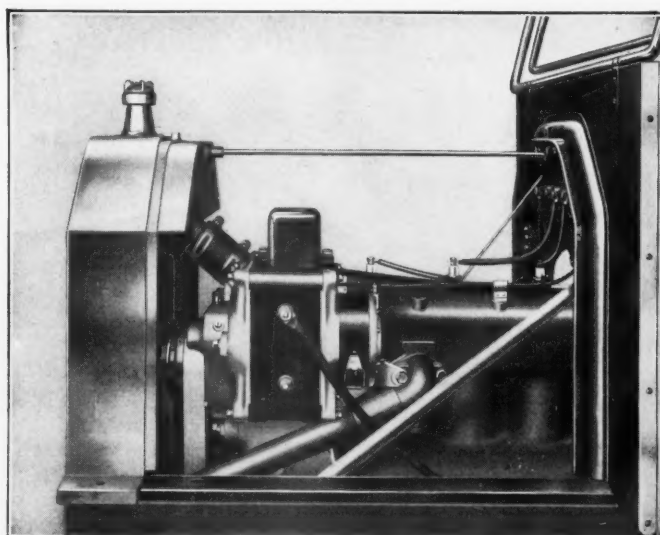
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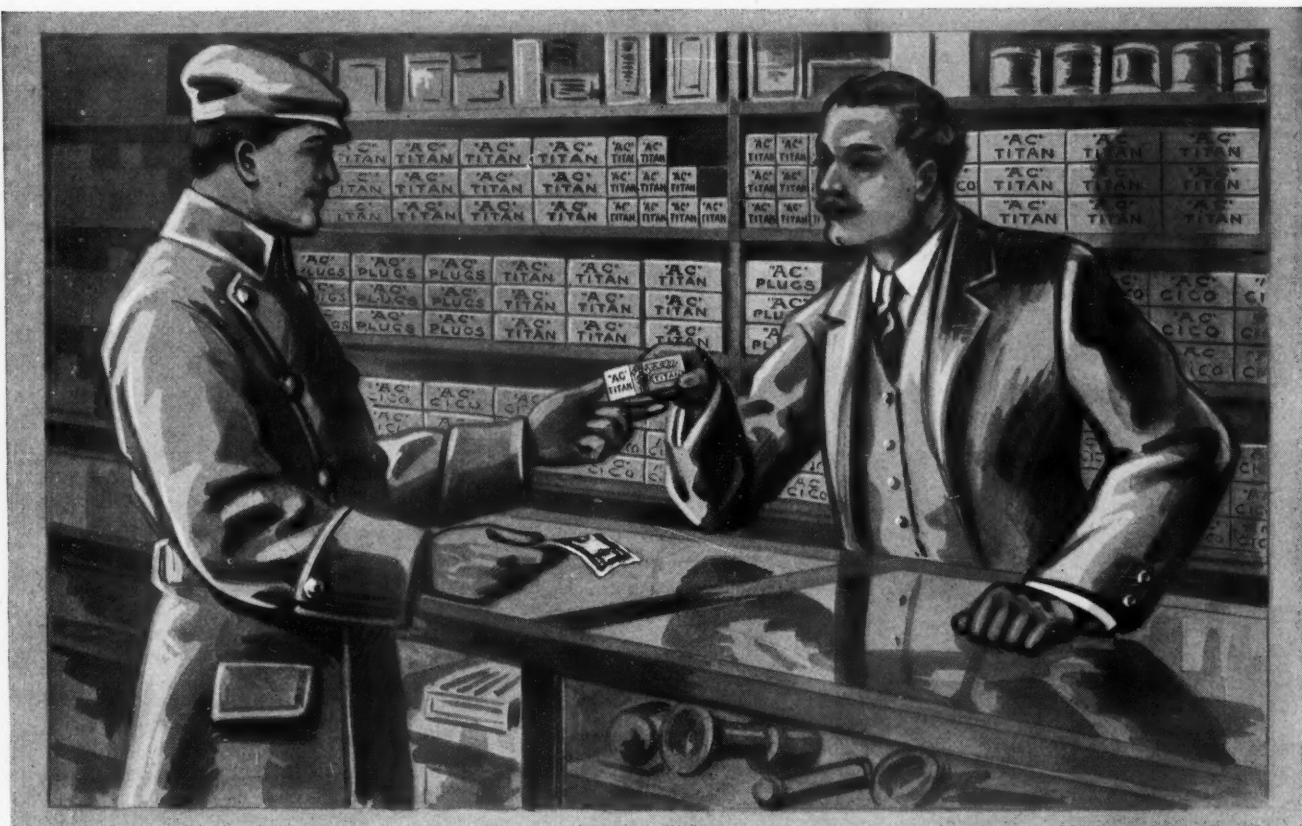
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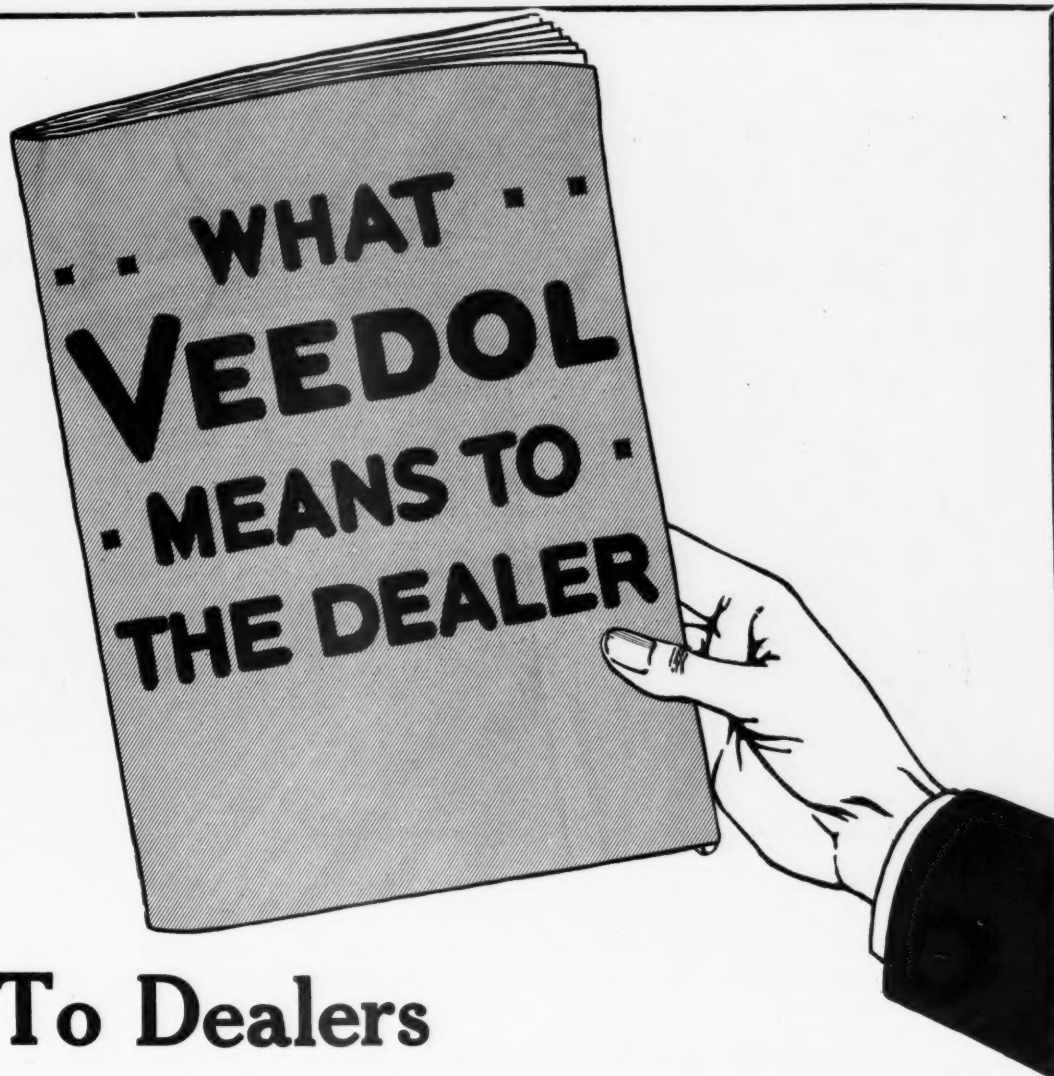


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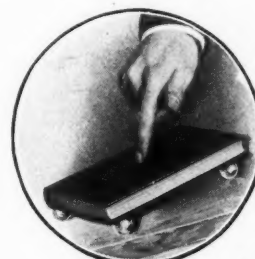
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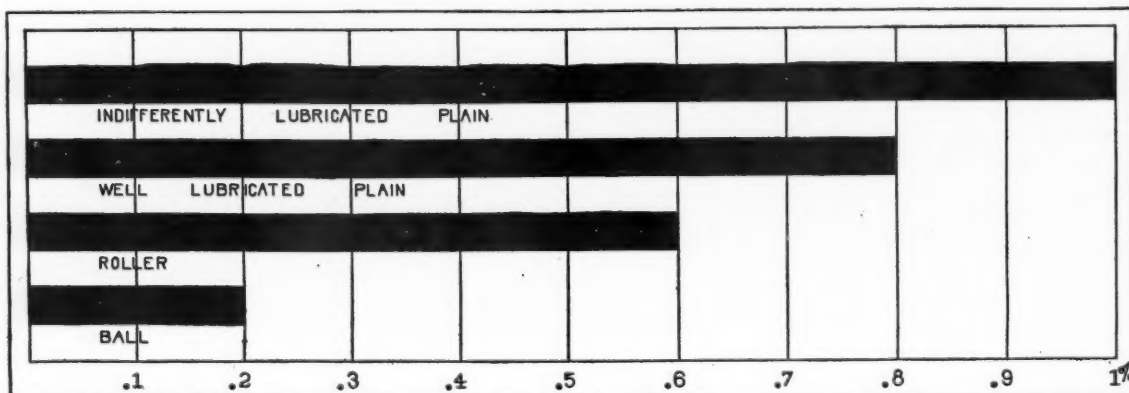
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Published by the
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910 South Michigan Avenue
CHICAGO ILLINOIS

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Volume XXVII

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No. 16

Contents

EL CAMINO REAL—THE HIGHWAY OF THE KING.....	5
Motor trail a monument of the Spanish conquest	
FRANCE'S NEW WAR CAR ABLE TO DO A MILE A MINUTE.....	13
Four-cylinder, 80 horsepower Gibson chassis used	
EDITORIAL—INCREASING ANNUAL REGISTRATION—SPRING ACCIDENT CHAPTER	14
NAMING COUNTRY HOMES WOULD AID MOTOR TOURISTS.....	15
Movement along these lines starts in Central Illinois	
RUSH WORK ON NEW YORK SPEEDWAY.....	16
Track and stands to be completed August 20—News of the racers	
PITTSBURGH SAFETY CODE DRASTIC.....	18
Hope to reduce number of traffic accidents	
SUBMIT MODEL JITNEY ORDINANCE.....	19
Los Angeles owners draft operating rules	
UNCLE SAM REPORTS FEBRUARY EXPORTS.....	20
Detailed statement showing growth of business	
BUCKEYES AIM HIGH.....	22
Ohio expects to take 75,000 new cars for season of 1915	
THINGS OUT OF THE ORDINARY IN MOTORDOM.....	24
Some of the crop of unusual in picture and story	
MOTOR CAR DEVELOPMENT.....	32
Description of Standard, Cornelian and Stanley	

DEPARTMENTS

See America First.....	15	From the Four Winds.....	40
Routes and Touring Information	26	Among Makers and Dealers....	41
Readers' Clearing House.....	28	Brief Business Announcements.	42
The Accessory Corner.....	38	Motor Car Repair Shop.....	44



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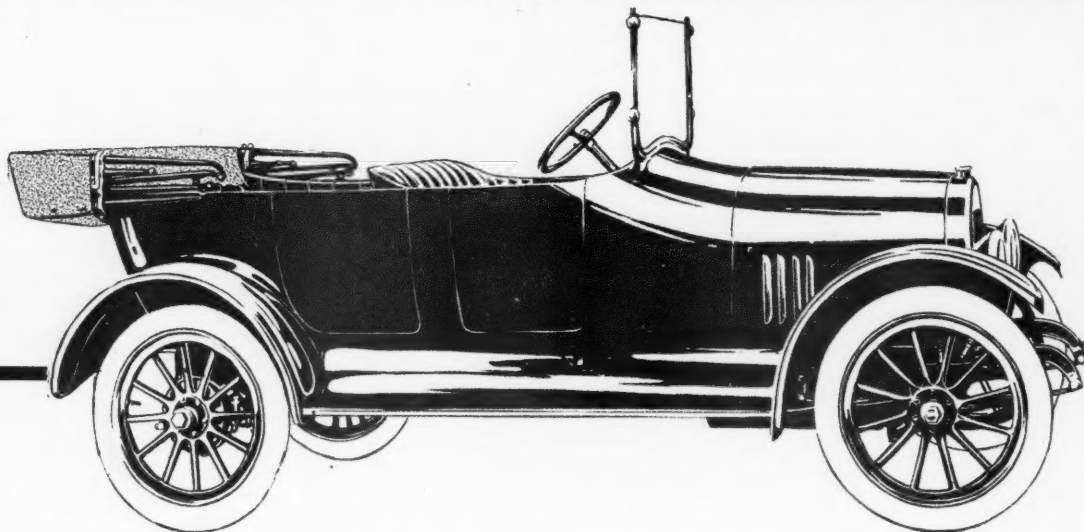
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OLD TIMES RESTORED BY HISTRIONIC ART

Scene at the end of the first round trip over El Camino Real as depicted in the Mission Play. In the foreground are George Osbourne as Father Junipero Serra and Charles Edler as Don Gasper de Portola, who commanded the Spanish expedition that made the journey from San Diego to 'Frisco and return, discovering San Francisco bay and laying out El Camino Real

By Al. G. Waddell

FOR the historic charm that hovers over it, El Camino Real, California's great motor highway that skirts the shores of the blue Pacific, probably has not a rival in this country.

El Camino Real is a long chain on which the devout Franciscan friars hung their missions almost a century and a half ago. With the mailed conquistadors of Spain, they tramped through the sand and dust and over the mountains to teach the redskin of the pale-face God and civilize the Indian. The majority of the houses of worship which they established along the road are standing monuments to their piety and persistence.

There are nineteen strung out on the 750 miles of highway between San Diego and San Francisco.

The highway of the missions was a road of colonization. California's history starts at the beginning of the El Camino Real.

CALIFORNIA'S great international expositions at San Francisco and San Diego are joined together by two superb highway systems which rank among the premier motor trails of the world. These are the inland route and the coast road, El Camino Real.

The inland route is a perfected chain of farm roads, developed and linked together under county and state supervision. The coast road is one of the oldest highways in the United States. The history of this road, El Camino Real, or the Highway of the King, is the romantic story of the exploration, conquest and development of the Golden state.

While thirteen colonies were struggling for American independence on the Atlantic coast, a band of daring Spanish soldiers and brown-froked Franciscan monks plodded along a wild trail from the silver strand of San Diego to the sand dunes by the Golden Gate. A narrow path, climbing over rolling hills and steep mountain

passes, through deep canyons and beautiful valleys, the Highway of the King was the first road ever trod by civilized men on the Pacific coast.

Flanked on one side by the blue Pacific and on the other by a wild and unknown continent and marked at intervals by isolated colonies, the mission settlements, El Camino Real stretched along the western coast line for 750 miles. This was the "Trail of the Padres." It was widened to accommodate the increasing travel.

From an almost unfollowable path, El Camino Real was worked into a marked trail. Traffic later developed the Highway of the King into a broad road.

When the wonderful state of California was lost to Spain, the missions were allowed to fall into decay. The centers of western America's first civilization were turned into stables and warehouses; but El Camino Real was developed.

Many years later, each county from the Mexican border to San Francisco, through which passed the old Highway of the King, worked El Camino Real into their



GEORGE OSBOURNE AS FATHER JUNIPERO SERRA

In the background is San Gabriel mission, established in 1771 and on the original El Camino Real. San Gabriel is located very close to the city of Los Angeles

county road systems. The original route was altered slightly by the county surveys, but practically the entire route was used.

In the early days, the old highway skirted the hills through the northern end of Orange county, several miles inland from the present route. At that time the country near the shore was marshy and unsuited to road building. There was a loop in the original trail, from the Mission San Gabriel down to the coast, along the present boulevard through Downey, Long Beach and Wilmington to what is now Vermont avenue, in Los Angeles, and back through the western limits of present Los Angeles to the San Fernando valley road. This detour was necessary because of the Los Angeles river, it is claimed. The river disappears on the flats near the sea and at that time it was easier to cross near the mouth.

Fearful of Savages

Another reason for the long detour was the presence of savages. These treacherous California Indians were more hostile in that section between San Gabriel and Los Angeles than nearer the sea. The road crossed the Conejo grade, ran along the shore to Ventura and over the mountains, the route now known as the Casitas pass, into Santa Barbara. The road on up the coast through Monterey to San Francisco

followed almost the same course as the new California state highway of today.

A few years ago, a society was organized in California that raised a large sum and erected sign posts and mission bells along the historic Highway of the King from San Diego to the Mission San Francisco de Solano, in the Valley of the Moon, made famous in modern years by Jack London. The bells of El Camino Real followed as far as possible the original road, but now, some mark with rusted majesty short stretches of deserted roadway, eliminated from the great highway system by the latest state surveys.

In places, miles are cut off of the marked road. In building the excellent concrete-base state coast route, the engineers followed the trail of the bells where it was practical, and the route is still known by its original name, but the road has been shortened to 134 miles between San Diego and Los Angeles and 504 miles between the southern California center and the northern exposition city.

Improving the Old Road

The California oil industry did a great deal to hasten the improvement of the old Spanish road. Large sums were spent annually on the road in various parts of the state, but the graded bed never was secure against the heavy winter rain storms. The heavy oil wagons cut deep into the surface and tore away the grades. The successful California ranchers also contributed to the development of the route, but when the motor car came, El Camino Real, as a landmark, was forgotten. The old road was appreciated and today it is one of the greatest commercial assets to the far western state.

Thousands of motor trucks annually carry rich cargoes along the improved trail. Day after day, the modern power wagon carries on the commerce of the thriving cities along the famous old road. Annually hundreds of thousands of motor parties glide along the beautiful stretches between the crumbling ruins of the ancient missions.

The trip that once required months of dangerous and laborious travel, may now be made with ease in a modern touring car in 3 or 4 days. The journey from San Gabriel to San Diego, which once required a week of the Franciscan's time, is now made within the speed limits in from 4 to 5 hours.

Record Trials Over Old Road

In the 1913 Los Angeles-to-Phoenix road race, which was over the old Spanish trail as far as San Diego, Barney Oldfield, in George Settle's big Simplex, made the 134 miles in 1 hour and 39 minutes. This was after a rain and before the state highway was completed. Louis Nikrent holds the round trip record over the Los Angeles-to-San Diego course, which is 8 hours 26 minutes. The Los Angeles-to-San Francisco record is held by the Hupmobile at 14 hours 29 minutes. These records all were made before the concrete highway was completed and probably would be lowered if the drivers dared to attempt to break them. California's highways are so well patrolled by speed kings of the law now that no road racer would get far on a record run. The county supervisors and state officials think so much of their roads that they will not grant a permit for a road race or a drive against time to any one.

Don Gaspar de Portola, captain of dragoons and first military governor of California, made the first overland trip from San Diego to San Francisco and return in 1769-70. He was in command of an exploring expedition sent out from San Blas in Baja California by Jose de Galvez, visitador general to the Spanish crown. Four expeditions were sent out to explore California and establish fortifications at San Diego and Montefey, two harbors that had been discovered by Sebastian Vascaino in 1603, when the explorer landed with 200 men and startled the naked savages by taking possession of the land in the name of his Catholic majesty, the king of Spain.

Two of the expeditions were by sea and two by land from San Blas. The ship, San Antonio, had left the peninsula several weeks behind the San Carlos, yet the San Antonio was the first to reach San Diego harbor. The San Antonio was commanded by Juan Perez, one of the most skilled pilots in the Spanish service at that time. He was from the island of Majorca, the home of Junipero Serra.

Eighteen days after the arrival of the San Antonio, the San Carlos entered San Diego harbor. The captain and crew were half dead with the scurvy. Dr. Pratt assisted in the fight against the infection, although he was suffering from the illness. Perez and his men constructed rude tents on the shore and nursed the sick. Death stalked among the members of both crews and the ranks were greatly thinned when the first land expedition, under the command of Captain Revera y Moncada, arrived.

The military commander ordered the

camp moved from the beach, where the graves of the dead Spaniards were so numerous, to the site of "Old Town," the original site of Spanish San Diego. For almost 2 months Moncada's men, the friars and sailors, battled with the scurvy. Then Governor Portola and the second land expedition arrived.

With the second land expedition, Fra Junipero Serra entered into California history. It was July 1, 1769, that Don Gaspar de Portola and his command joined their comrades. They had been on the difficult overland journey about 50 days. The arrival of Portola and Serra relieved the sufferers and gave new life to the settling and exploring expedition organized by the visitador and Serra.

First Services on Coast

The day after Serra and Portola arrived was Sunday. A solemn thanksgiving mass was chanted by the Spaniards. On the side of a hill, overlooking "Old Town" and the San Diego bay, where a huge monumental cross, erected by the Order of Panama to the memory of Father Serra, now stands, the first Christian services held on the Pacific coast were solemnized. An altar was erected under the southern California skies. In the July sun, the smoke of black powder served as incense and the explosions of the soldiers' muskets was the music.

Out of the 219 men originally with the four expeditions only 126 were left. The fifth division of the expedition, which was the third sea party, on board the San Joseph, never was heard from. It is believed that the scurvy broke out among the men of the crew and that the San Joseph with its stricken passengers was lost at sea. Among the explorers who attended the first mass at San Diego were two surviving members of the San Carlos crew, the crew of the San Antonio, and remnants of the commands of Lieutenant Don Pedro Fages and Captain Rivera y Moncada, who both served later as military governors of California.

There were a few Indian neophytes remaining with the explorers, the majority of these having deserted the friars on the overland journey through Baja California. There were the five Franciscan monks, Serra, Vizcaino, Parron, Gomez and Fra Crespi, the last named the keeper of diaries, who came from Majorca with Serra and who now lies beside him at Carmel mission.

In addition to the commanders, Portola, Fages and Rivera, there remained Dr. Pratt, the only physician on the Pacific coast, with enough work for two men, and the faithful Sergeant Jose Ortega, who later was commissioned a lieutenant in the king's army, and was one of the few well-balanced men in the Spanish military service who figured in the early history of El Camino Real and California.

After the mass was chanted, the officers held a conference. It was decided to send the San Antonio, under Perez, back to San

Blas for recruits, both military and naval. Fra Serra and Dr. Pratt were to remain at San Diego with a small guard and to attend the sick. Portola was anxious to move on to Monterey. It was not possible to explore the harbor by water, owing to the blow dealt by the scurvy, so the main body of the troops and all the officers left on the long trip up the coast—the trip that gave berth to California's most beautiful motor trail.

Portola did not wait for the founding of San Diego mission, but pushed on to the port of Monterey. The friars, Crespi and Gomez, accompanied Portola. He had fifty mules and between sixty and seventy men, most of whom were mounted. Only eight or ten soldiers were left to guard the San Diego colony. Fra Serra, with Fra Parron and Vizcaino and Dr. Pratt, remained on shore. The death ship, the San Carlos, was guarded by its captain, a pilot by the name of Vila.

San Diego Mission Founded

Fra Serra decided to lose no time in founding the mission at San Diego. He raised a cross on the side of the hill overlooking the bay and the Pacific and dedicated it to the honored Francisca, San Diego de Alcalá. This was the first civilized settlement in California and the founding of the first mission also marked the birth of the Highway of the King, July 16, 1769. Had the mission not been founded, the Spaniards probably would have returned to lower California and the trail-blazing of Portola's party would have been fruitless.

While Serra was formally founding the possessions of the king and the cross, the naked Dieguenos stood around and watched the ceremonies with wonder. They listened with fear to the clanging chimes of the great metal bells.

The California Indians were the lowest to be found in either North or South America. It is claimed that they came from an entirely different stock than the wild tribes of the eastern coast. They were Digger Indians, more degraded than any tribes of Asiatic origin.



AS REPRODUCED BY MISSION PLAYERS

In the above Lucretia del Valle represents Senora Josefa and Fred Wilson Ubaldo, the scene being that in which the San Juan Capistrano mission was turned into a stable in 1847

California abounded with game. The streams were well stocked with fish and the Pacific offered the choicest of fresh sea foods, but the California Indian ate worms, frogs, rats, gophers and were practically buzzards in human form. The balmy climate made the savage the incarnation of indolence. They were too lazy to fish and a favorite food was a mess of fish picked up along the shore, where the sun had softened the meat, hardly an appetizing meal.

The Californian redskin was a slow thinker. As a fighter he was like a wolf or a coyote. He was brave when he knew he had no chance to lose, but three Spaniards could scatter a whole tribe of the low-browed, slothful dog-worshippers that Serra and his modest brothers came to civilize.

Worshipped a Stuffed Dog

Most of the California tribes worshipped a stuffed god by the name of "Chinigichin." This "Chinigichin" had come down from the stars to instruct the tribes in dancing and then had gone back to his home in the heavens. The image of their god was a stuffed coyote skin and this they worshipped. Instead of a happy hunting ground, the degraded Californian's heaven was a place where people could enjoy a lazy life forever, eating, drinking and dancing, with a large assortment of wives.

The Californians did not scalp their victims on the field of battle. They cut off fingers, toes and ears, which they kept as souvenirs of triumphs. When a prominent citizen of a rival rancharia fell in battle, the Californians partook of human flesh. They were clever thieves and in their silly amusements, resembled an overgrown breed of monkeys.

First Attack on Mission

The first attack on the mission came soon after the main body had left San Diego on the trip up the coast. It was found necessary to keep two soldiers on the San Carlos with Captain Vila. One afternoon, just after mass, a band of savages made a wild raid on the mission. Armed with their weapons, they entered the building and stole everything in sight. They even took the coverings off the sick

route, practically along the course followed by the Santa Fe roadbed of today. But 12 miles were covered the first day. The fearless Ortega went ahead with a detachment of foot soldiers and mounted soldados de cuera (soldiers wearing heavy leather armor) and cut the trail for the main body.

The second night's stop was near Del Mar. The third day the Spaniards reached a spot back of Oceanside, about 4 miles from the coast, and believed to be the site which later was chosen for the Mission San Luis Rey. This course was followed for many years and even when the state highway was being built this road was used as the popular motor route to San Diego.

The fourth night, camp was made on the coast near the spot selected for the San

name of the pueblo and which is the name of the city.

Portola and his men camped on the hill just off of Broadway, not more than 500 or 600 yards from the site of the Times building. For 2 days the expedition lounged under the trees on the brow of the hill, overlooking the river and the broad stretches of beautiful meadow.

Many Old Names Retained

Moving on up the coast, Portola named various places along the trail. Many of these names still are retained by cities, passes and rivers, although there were many places that were renamed later. The Conejo grade was where they found many rabbits. Huneme was an Indian name. Casitas pass was where the explorers found many queer little huts occupied by the Indians and the pass was called "Lit-



FIESTA SCENE IN THE MISSION PLAY DEPICTING THE SPANISH PERIOD WHEN THE MISSIONS WERE IN THEIR HEYDEY

and the dying. The Spaniards lost one man and three were wounded before the savages were put to flight. They did not attempt to stand up before the muskets of the white-faced strangers long.

Soon the curious Dieguenos returned to the mission, where Dr. Pratt bound up their wounds. Serra gave them presents and this treatment offered the Franciscan leader his first grip on the savages.

The expedition on the march up the coast did not escape the ravages of the scurvy. Sickness continued to spread and many of Portola's men died on the march and were buried along the trail which was to become the great California highway. Sixteen members of the party lost the use of their limbs from the scourge and had to travel strapped to wooden frames lashed to the backs of mules. Portola and Rivera also suffered from the sickness.

Leaving San Diego, Portola and his men marked out over the present Rose canyon

Juan Capistrano mission, and the fifth day's journey brought the travelers to a place about where El Toro is now located, in Orange county.

The next night, camp was made on the banks of the Santa Ana river and Portola gave the name to the spot which still clings to the beautiful Orange county seat. The Santa Ana river was called the River of Jesus Christ at that time. There was another stop near the present town of Fullerton and the eighth day brought the expedition to a camp near Whittier, where the San Gabriel mission originally stood.

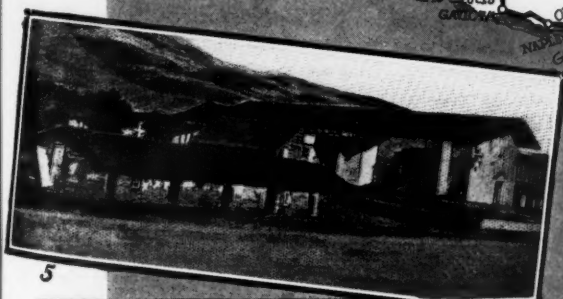
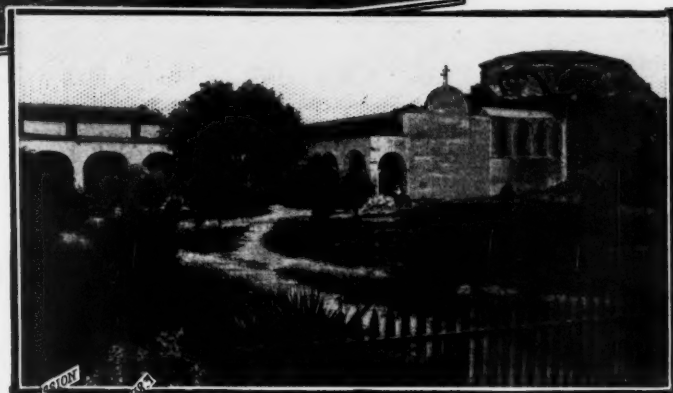
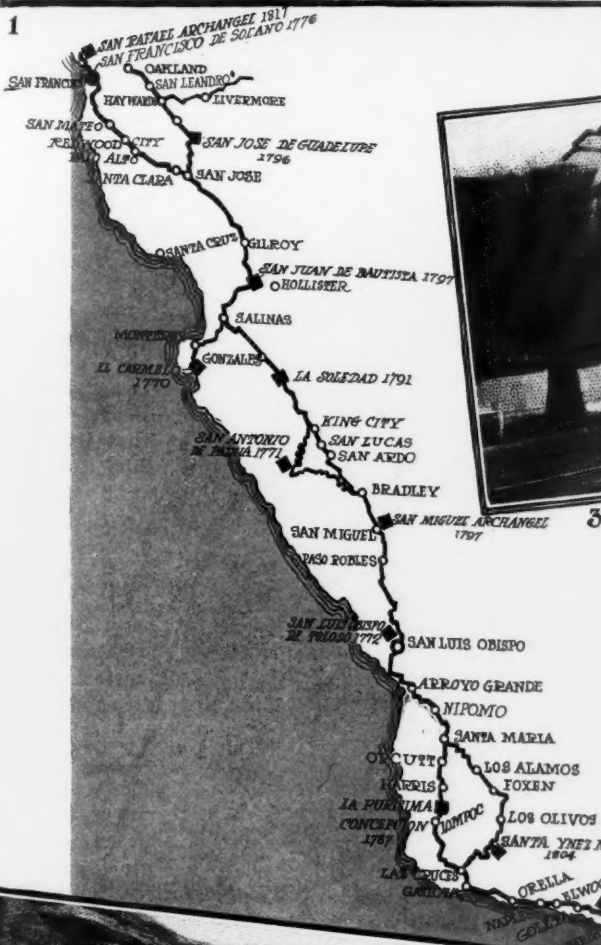
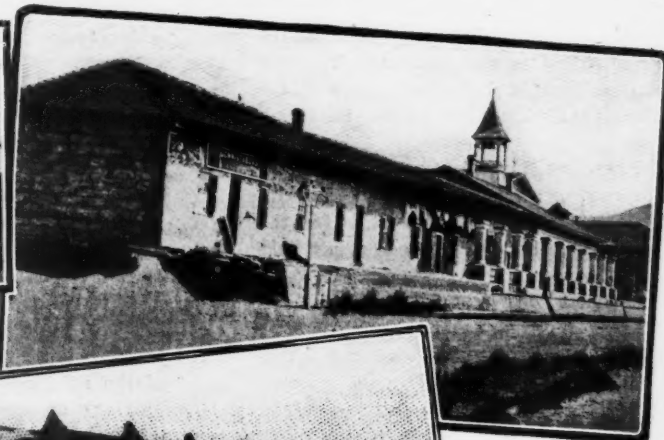
Los Angeles Located

Portola then followed up the San Gabriel river to the mountains, where he crossed the stream and marched through Pasadena and into Los Angeles. Portola named Los Angeles. The spot is called in his diary, Our Lady Queen of the Angels by the River. The modern Los Angeles is but an abbreviation of the original

the House pass." Along the route the sites suitable for missions were noted and named and many of these still remain. Portola named Santa Barbara, San Marcos, Santa Ynez, San Juan Bautista and San Francisco.

At Ventura, the expedition stopped for several days. They met at that place some Indians with more intelligence than the rest of the Californians. These Indians had some crude boats with which they fished. They also had a food of ground acorns that was really appreciated by the half-starved Spaniards.

After being fed and entertained by these friendly savages, the pilgrims moved on over the Casitas pass through the Santa Barbara country, over the San Marcos pass, and into the Salinas valley. It was easy traveling through the wide valley. The strangers turned back to the coast and camped on the shores of Monterey bay, but did not recognize the sheet



MISSIONS ON EL CAMINO REAL

- 1—Mission San Antonio de Padua, erected in 1771
- 2—Mission San Luis Obispo de Tolosa, erected in 1772
- 3—San Gabriel Mission, founded in 1771
- 4—Mission San Juan Capistrano, founded in 1776 midway between San Diego and Los Angeles.
- 5—Mission San Jose de Guadalupe at San Jose, founded in 1797
- 6—Mission Santa Barbara, founded in 1786

Map of El Camino Real as shown in the "California Mission Tour" book published and copyrighted by the Automobile Club of Southern California



of water. It had been described from the sea side and it was little wonder that the explorers thought it to be a part of the Pacific, not being able to see the landmarks.

San Francisco Bay Discovered

For weeks, the discouraged and fatigued Spaniards looked in vain for the Bay of Monterey. The food supply was getting low and Ortega went out to shoot some deer to relieve the sufferings of his comrades. During one of these hunting expeditions, Ortega discovered San Francisco bay. He came back and reported that he had found a large body of inland water. Portola and the rest of the party dragged on to San Francisco, where the new discovery was named in honor of Saint Francis.

With some rudely constructed small boats they explored parts of the bay and found that it was not Monterey. Then, discouraged and with half of his men gone, Portola gave up the search for Monterey and started back to San Diego.

After 7 long months of marching, Portola reached San Diego with a remnant of his command. He was disheartened and determined to leave the country. Serra tried to persuade him to remain. The fra also had undergone great hardships, but with his strong will, determined to remain in the new country even if all the other members of the expeditions returned to Baja California.

A day was set for the departure, but Serra held out until the last. Finally he made arrangements to remain and hold California alone, if the others deserted. The San Antonio, which had gone for supplies 9 months before, had not arrived and the men were in great distress. They ate sea gulls and in one instance a mule provided them with meat.

As the day set for the departure drew near, Serra spent hours in prayer. In the Mission Play, which annually runs for weeks at the San Gabriel mission and attracts thousands of motorists from all parts of the state, one of the strongest scenes is the arrival of the San Antonio with supplies and recruits, after Serra had spent a whole day in prayer on Point Loma.

The San Antonio had been ordered di-

rect to Monterey, where it was believed that a settlement would be well established. Passing San Diego, the ship lost its anchor and could not pass Point Conception, one of the most difficult points on the Pacific coast for sailing vessels. Putting in at Ventura for fresh water, the Indians made signs to inform them that a large party of men with long whiskers had gone south over the trail in a very disheartened condition. Captain Perez immediately set sail for San Diego and arrived just in time to prevent the abandonment of the settlement.

The arrival of the San Antonio with supplies and a new crew for Vila and the San Carlos started another trip over El Camino Real. A small guard was left at San Diego. Serra and Dr. Pratt sailed on

the presidio. This was done and it is known as Carmel mission throughout California, although it is the San Carlos mission.

More Missions Located

In 1771 the San Carlos arrived from Lower California with ten additional Franciscans and supplies for the missions. Four of the friars were sent south over El Camino Real to found the San Gabriel mission and the famous San Buenaventura mission. Serra himself, with Fra Miguel Piaras, set out to found the Mission San Antonio de Padua. Some twenty-five leagues from Monterey they discovered a suitable spot and unpacking the bells, the founding took place.

The mission at San Gabriel was successfully founded. At first the savages were friendly, believing the strangers to be wonderful creatures, but when the Spanish soldiers began their ill-treatment of

the native women, the Indians became hostile. The chief of the tribe had a beautiful girl wife. The worthless soldiers treated her with the same shame as the rest of the squaws and when the red-skin leader and his warriors rose up to avenge the wrong done his

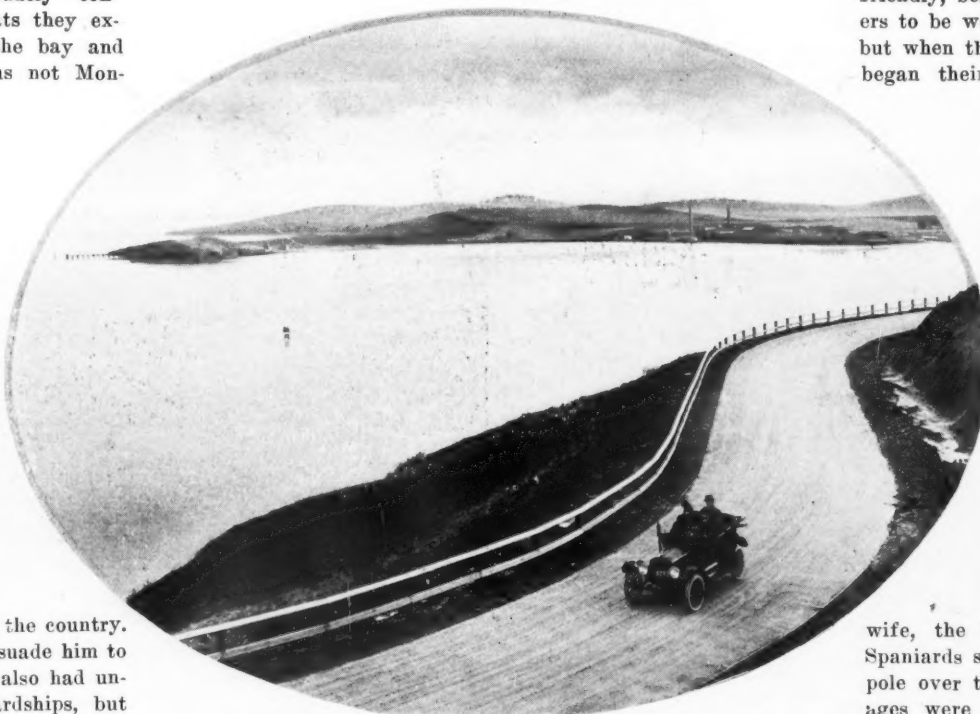
wife, the former fell. The Spaniards stuck his head on a pole over the gate. The savages were willing to remain peaceful after that.

Portola had returned to Lower California soon after the

founding of Monterey and the thick-headed young Lieutenant Fegas had been given military command of the territory. Instead of restoring discipline among his lawless soldiers, the egotistical and brainless Fegas ordered the guard at San Gabriel doubled, commanded the friars to have nothing to do with the Indians and forbade any Indian to enter San Gabriel mission. This was but the first move on the part of the young officer that retarded the growth of the mission system and the prosperity of California.

The trouble at San Gabriel and the orders of Fegas caused the postponement of the founding of the Mission San Buenaventura and the Franciscans, who were to have served in the Santa Barbara region, remained at San Gabriel.

The four missions necessitated a great deal of travel over El Camino Real, but Serra did not make a trip over the route



NEW SHORE LINE ROAD, A STATE HIGHWAY, A FEW MILES SOUTH OF SAN FRANCISCO

the San Antonio. Portola, Fra Crespi and the main body set out on the second northern march over the Highway of the King. It required almost 2 months for this trip, but the Spaniards arrived in safety and on June 3, 1770, Monterey became a province of his most Catholic majesty, King Carlos III.

Fourth Trip Over El Camino Real

A young sailor and a soldier volunteered to carry the news south and made the fourth trip over El Camino Real.

Travel over the road became almost a necessity with a mission at each end of the Highway of the King. The Monterey mission and presidio were located at first on the shores of the bay, but the renegade soldiers soon chafed under the idle life and aroused the hatred of the Californians by their assaults on the native women. Serra announced his intention of moving the mission over to Carmel, 5 miles from

until late in 1772. Under the command of Fegas, the lazy soldiers preferred to loaf and starve rather than to take care of themselves. The missions practically fed all the residents of California.

Two Transports Arrive

At last two transports arrived at San Diego with supplies, but on account of contrary winds the ships could not make the port of Monterey. Serra determined to go south and try to persuade the sea captains to make another attempt to sail up the coast or bring supplies overland. Strange that the young military governor, Fegas, could not have thought of this, but either he was too lazy to use the small brain he did have or was anxious for the missions to fail, so that he could return to Lower California, which was more suited to his highly cultivated tastes.

With an escort of soldiers, Serra and Padre Cavaller, who was to minister to the Mission San Luis Obispo, Serra set out for San Diego over El Camino Real. On the journey south the fifth mission, San Luis Obispo, which later became one of the wealthiest missions in the country, was founded September 1, 1772.

Upon arriving at San Diego, supplies were sent overland to the missions along the Highway of the King and the suffering was relieved. Serra sailed on the San Carlos for Mexico to seek the aid of the new visitador for the missions and to apply for the removal of the inefficient Fegas.

From Vera Cruz, Serra walked overland, following the same route he had trod when he first arrived from Spain. On the first journey over this road, mosquito bites caused a swelling and infection of the leg, which crippled the friar for the rest of his life. On the second trip over the route to Mexico City Serra was taken ill with the fever and was so low that he was given up to die, but his brave spirit carried him through and he continued his journey.

For months he labored for assistance in the mission work and finally secured it. He returned to California and made his second overland trip up the coast, covering El Camino Real.

When Fegas was removed, his place was taken by Captain Rivera y Moncada, who was a member of the first expedition over

the famous highway. Rivera had been in Mexico and it was with swelling pride that he relieved Fegas of the command of California and took over the presidio of Monterey. Rivera was an able man, but stubborn. His willful acts soon brought him into disfavor with the savages and the friars and after he had gone into the church at San Diego to capture an Indian, who had taken refuge there, he was excommunicated.

While Serra struggled for the betterment of the savages and tried to build up California, the weak-minded officers of the king's army did everything possible that would hinder and block the work. The friars wanted Ortega, who had been appointed a lieutenant, to be given the military command, but it was believed that

ico for the original population of Los Angeles. The pueblo was established and from the very first it was a hot bed of revolution. The twelve original settlers almost all came to a bad ending and it is rather dangerous to go far back into any early-day family histories in Los Angeles.

Colonizing Santa Barbara

Governor Neve requested Serra to appoint friars for the Santa Barbara and San Buenaventura missions. Serra hurried south and after a difficult journey, on account of his years, stopped at the pueblo Los Angeles. The next morning he hurried out to San Gabriel. Lieutenant Ortega was summoned from San Diego to take command of the new post at Santa Barbara. Neve, Serra, Ortega, soldiers and settlers set out to colonize the Santa Barbara region.

That evening a messenger overtook the party on the highway with a note from Don

Pedro Fegas, who had unexpectedly arrived with the rank of lieutenant-colonel. Neve turned the command over to Ortega and returned to San Gabriel to meet Fegas. Serra continued on up the Highway of the King to a spot selected and established his last mission, which was

known as San Buenaventura.

Neve ordered that the Presidio of Santa Barbara be completed before the Santa Barbara mission was established. Rather than wait for this, Serra left one friar with the soldiers and went on to

San Carlos before stopping.

Junipero Serra spent 15 years in California. Before he died he saw El Camino Real a well-traveled road. At the time of his death there were nine missions in California. The names of these, from north to south, were San Francisco, Santa Clara, San Carlos, San Antonio de Padua, San Luis Obispo, San Buenaventura, San Gabriel, San Juan Capistrano and San Diego de Alcalá.

From a wilderness, the Franciscans in 15 years had transformed California into a flourishing province. Serra and his brothers had converted the unfollowable trail into one of the best roads in America at that time, over which a man could travel and be almost sure of a place to rest and a fresh horse at the end of each day's journey. There were 12,000 head of horses, mules, goats and cattle, which had multi-



A \$250,000 BRIDGE OVER ARROYO LECO, BETWEEN PASADENA AND LOS ANGELES. BELOW ARE THE RUINS OF OLD ROAD CLAIMED TO BE ROUTE COVERED BY PORTOLA ON HIS FIRST TRIP OVER EL CAMINO REAL

he was not enough of a high-brow to hold the place.

After Rivera had marched up and down El Camino Real many times and the road had been lengthened to San Francisco, orders came for his removal. Felipe de Neve took command of the province. Neve was a man of intellect and he realized that Serra was a big man mentally if but a crippled old friar physically.

Soldiers Work on Road

Neve did not enjoy the post and determined to resign, but went to work with a will, improving the highway and the settlements. He put the soldiers to work and built stone walls around the Presidio of Monterey. He ordered the establishment of the pueblo San Jose. He was promoted to the rank of lieutenant-colonel and gave up the notion of resigning.

Twelve families were recruited in Mex-

plied under the missions alone. Large ranches, irrigated from flowing streams and thriving settlements were scattered along El Camino Real.

Before he died, Serra sailed to San Diego and made his last trip up the coast over El Camino Real, inspecting the missions and confirming neophytes. His old enemy, Feges, returned as governor of California, but the feeble old padre did not suffer much from the crude rule of the simple-minded officer in his last days.

After the death of Serra, twelve other missions were established and finally were planted along the Highway of the King, each one just a day's journey apart.

Under Mexican rule, California was torn by internal friction. Political troubles, such as are now eating the heart out of Mexico, destroyed the missions. Grafting Mexican politicians banished the Franciscans and ran the Indians out of the missions. In Los Angeles, many revolutions were born and at times there were as many as three or four bullying "cholos" claiming to be the governor of the state, just as is the case in Mexico today.

Under Mexican Rule

The capital of the state was shifted about over El Camino Real to suit the fancy of the party that held the upper hand. To move the capital of California in the old Mexican days all that was necessary was an ox cart and a driver. A load of Spanish documents and a lot of nerve was about all that there was to the governorship of the state under the old Mexican rule.

The citizens of early Los Angeles were a choice set. The man who designed and built the new San Gabriel mission and the Plaza church in Los Angeles was captured from a French pirate ship. His name was Chapman. He landed with a party at San Buenaventura mission and robbed the place of everything of value. A messenger was sent south over the highway to warn the southern California mis-

sions. At San Juan Capistrano, the padres buried all their holy treasures and took refuge in the canyon back of the mission. When the pirates arrived they found nothing and three of their number were captured, Chapman being one. He was sent to Los Angeles and placed in jail for several years. The original missions were rude huts of boughs, with thatched roofs, and these were rebuilt into large buildings. The Indians near San Luis Obispo were hostile and several times they shot burning arrows into the thatched roof and set the mission on fire. Father Louis Antonio Martinez then discovered the clay for making brick tiles. The mission was

roofed with tile and later all the missions were tiled with fire-proof shingles.

Fifteen years ago the Automobile Club of Southern California was organized. The first club run was over the King's Highway from Los Angeles to San Diego. The supervisors of San Diego county saw what the motor car would do. The 134-mile run was a great achievement for the motor car and did more for the cause of good roads in California than any other one event in the history of motoring in that state.

San Diego county took the lead and worked the old Highway of the King into excellent condition. Other counties fol-

lowed. The Automobile Club of Southern California began a sign-posting campaign and at a cost of several hundred dollars, the first club signs were placed on the coast road to San Diego from Los Angeles. In 1911 the improved Highway of the King had been sign posted by the Automobile Club of Southern California from San Diego to San Miguel. The original cost was \$7,100. The total cost on El Camino Real for signs alone to date is figured at \$11,000 by county and state officials, as well as directors of the club.

Enthusiasm Aroused

In 1913, a great California good roads convention was held at Santa Cruz. The Automobile Club of Southern California was active in the campaign for the improvement of both the inland and coast routes. The club had just completed signing the inland route from San Diego to Fresno, at a cost of \$12,000. At the good roads convention, bonds to the amount of \$18,000,000 were voted.

El Camino Real is no longer an uncertain graded road, but a paved highway. Deep into the earth the concrete base is laid and when the last of the old California missions have crumbled away, the California state highway will remain, the greatest monument ever erected in the west.

The Old Route and the New

THE original camp of the Spaniards in California was on the shores of San Diego bay. The camp was then moved north about 3 miles to the location of old San Diego, the ruins of which still stand. Old Town was the southern end of El Camino Real in the early days. Father Serra held the first services at Old Town but founded the mission 7 miles up the San Diego river valley. To the tourist the drive up the valley to the ruins of the old mission offers great beauty with a touch of the old romance of the early days.

The state highway follows the coast line through Pacific Beach and La Jolla, going over the Torrey Pines grade and through Del Mar to Oceanside. Portola on his first trip up the coast and along the route of El Camino Real followed the Rose Canyon route, striking the present state highway several miles north of La Jolla.

A short distance below Oceanside, Portola on his first trip detoured from the coast and, following the line of least resistance, passed through the beautiful valley in which the Mission San Luis Rey later was located. The padres adopted another route, however, which became the recognized Highway of the King. This altered route ran inland from Oceanside to the Mission San Luis Rey and followed almost the same course as the Portola expedition, coming back to the coast below San Juan Capistrano. The state highway runs along the coast below San Juan Capistrano, the same route as the Portola expedition followed, but El Camino Real ran a short distance inland, although parallel to the Portola route.

For 7 miles out of Capistrano the Portola route and the Highway of the King followed the same road, and this stretch is now incorporated in the state highway system. Portola branched off from what is now the state highway about where El Toro is now located and followed the Trabuco canyon road to a spot on the Santa Ana river, a short distance from the present town of Santa Ana. For many years this route was used and then El Camino Real was routed into Santa Ana. It was too marshy in the early days for a road along the present state highway route and El Camino Real came out north of Whittier.

Portola then turned northeast, passing through the present town of San Gabriel, which was built several years later, and traveled to the mountains back of Pasadena. He then followed the route of the present Foothill boulevard into Pasadena and Los Angeles. San Gabriel mission was originally located nearer Whittier than it is today, but it was later moved back off the road, on the San Gabriel river. In a short time the Highway of the King also took another course. The padres and the Spanish soldiers traveled direct from the mission into Los Angeles.

Out of Los Angeles on the way north the route of El Camino Real is changed but slightly by the route of the state highway. Portola's route and the latter developed road went over the Conejo grade, which was named by Sergeant Ortega, of Portola's expedition. The Custias pass still is in use almost the entire year through and was the popular route into Santa Barbara from the south until the Automobile Club of Southern California made the Rincon sea level road the popular highway.

Portola went over the San Marcos pass, which still is an attractive and beautiful California mountain highway. There is some discussion among California historians regarding the route followed by the Highway of the King from Santa Barbara to Santa Maria. It is commonly believed that El Camino Real was along the present coast route to Gaviota, then north to the Mission La Purisima and on to Santa Maria over the Portola trail, with a loop running inland several miles over the Gaviota pass to the Santa Ynez mission. The state highway runs through Gaviota, over the Gaviota pass and through Los Olivos and to Santa Maria over a route several miles east of the Portola trail.

South of San Luis Obispo, Portola cut off several miles by traveling a course east of the present state highway, which is but a short distance west of El Camino Real.

All the routes through Paso Robles and to a point 6 miles north of the Mission San Miguel are the same. Portola's route was over the Jolon grade, but El Camino Real and the new state highway follow an eastern course into King City. From King City to Salinas, by the ruins of lonely Soledad mission, a distance of 47 miles, Portola laid out the Highway of the King that later became the state highway. The route runs on an almost straight line up the center of the fertile Salinas valley.

From Salinas the Portola expedition turned off to the sea in search of the Bay of Monterey. They discovered the bay, but did not recognize it from the descriptions. Monterey was the northern end of the Highway of the King for many years, but when San Jose was founded El Camino Real rolled northward by the doors of the Mission San Juan Bautista, 88 miles south of San Francisco, in the valley of the San Benito river to the Pueblo San Jose and the Mission San Jose de Guadalupe, 33 miles south of the city of Oakland. Here the Highway of the King stopped, but in the later days of the Spanish regime the San Jose-Oakland road was laid out.

From the Pueblo San Jose to San Francisco, where the Highway of the King ended at the entrance to the Mission San Francisco de Asis, the road became a wide highway soon after the founding of the pueblo and St. Francis' own mission. The state highway of today between San Jose and San Francisco, known as the shore line road, is the improved trail of the padres.

The Mission Santa Clara de Asis was on the Highway of the King 9 miles north of the Pueblo San Jose. All that remains of the mission today is an adobe wall which has been incorporated into the buildings of the University of Santa Clara. The Mission San Francisco de Asis, which was later renamed Dolores, still remains as a relic of the mission days and marks the end of the Highway of the King. With its red tiled floor, which still bears the tread of the pious priest, it is one of the real landmarks of the exposition city and a mecca for motor tourists.

France's New War Car Able to Do a Mile a Minute

Four-Cylinder, 80-Horsepower Gobron Chassis Used

By W. F. Bradley

PARIS, April 2—Capable of more than 60 miles an hour ahead and 20 miles an hour on reverse, having double steering, carrying four mitrailleuses, with armor plating impervious to rifle bullets fired at almost point blank range, the latest French type of armored motor car is a formidable weapon of attack. The design of this vehicle is largely the work of Count de Lambert, the first pupil of the late Wilbur Wright, and of Paul Tissandier, a pioneer French aviator and engineer, who also took his first lessons in flying from the Dayton air pilot.

The chassis employed is an 80-horsepower Gobron having a four-cylinder double piston motor of 4.3 by 9.8 inches bore and stroke. Although the motor differs from the standard type by reason of the use of two pistons per cylinder, there is nothing experimental in the chassis. Double piston motors have been made by the Gobron company for about 12 years and were very successful in the early racing days. The chassis has a four-speed gearbox and chain drive. Combined with the ordinary steering gear is a supplementary control of the front wheels by means of stout steel cables brought to a boat type steering wheel in the rear of the car. The driver remains at the steering wheel at all times and always has control of the motor, but when it is necessary to go astern, a second man takes the wheel at the rear of the car, obtains a view of the road through a small eye hole, and directs the course of the car while giving directions to the man behind him. Owing to the high power of the motor, which makes possible a speed of 65 miles an hour on the level, it has not been necessary to modify the gearbox, for the ordinary reverse gives a speed of 20 miles an hour.

Built for Rough Service

While detail improvements might be possible in the control and reverse, practical experience has shown that this type of vehicle is thoroughly satisfactory. Nothing has to be changed on the ordinary design, and the addition of double steering does not interfere with any of the existing features of the car. This is most important when cars have to be produced under war conditions and in the shortest possible time. The chassis is of much stouter construction than those employed up to the present, but it is found that this extra strength is needed for rough work at the front.

A special steel body built of plates 4 millimeters thick is carried on the chassis, the protection extending forward over the top and sides of the motor and radiator, and steel doors capable of being opened or closed from the interior are hinged in front of the radiator. The body forms a single compartment, with entrance on the

left side. The driver is placed low, and is completely encased on sides and top and has a forward view under a hinged steel shutter. When the car is under fire, this shutter is closed and a view of the road ahead is obtained through an opening 2 inches in diameter.

The armament of this car is the most powerful yet adopted. There are four mitrailleuses, which can be placed two on each side or one on each side, one ahead and one reverse. The destructive powers of such a vehicle are tremendous, while it is practically invulnerable to anything but shell fire. Pneumatic tires are fitted front and rear, those at the front being single and unprotected, and those at the rear are twins with steel casing around them. The wheels are disk steel type. The armor plating at the rear is very complete with a view to preventing bullets or pieces of shrapnel entering and damaging the driving chains or the gearbox.

PROGRESSIVE SHOW IN MILWAUKEE

Milwaukee, Wis., April 19—Something new in the way of motor car shows was introduced in Milwaukee on Saturday and Sunday, April 17 and 18, under the name of "Progressive Automobile Show," by the Milwaukee Automobile Dealers, Inc., the new trade organization supplanting the Milwaukee Automobile Dealers' Association, existing since 1910. The show was a decided success and each spring hereafter will be repeated.

The progressive show idea consists of private exhibits of cars and chassis in the individual showrooms, as distinguished from the annual show held in the Auditorium in January of each year. Each of the thirty-two members of the association presented the latest models fresh from the factory, augmented in many cases by stripped and cut-out chassis such as usually are furnished for winter show purposes. The fact that the show was held in each individual salesroom or garage gave the

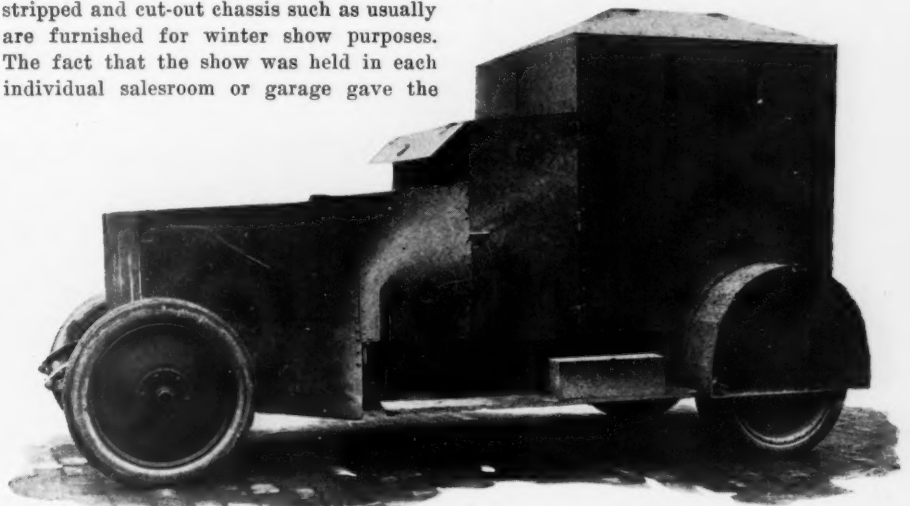
dealers much greater show space, enabled them to get in closest touch with people who are ready to buy cars, at the proper period of the year, and with the last word in models to exhibit.

Nearly 100 demonstrating cars, bedecked with signs reading: "Progressive Auto Show—Get In" were used to transport show visitors from one garage to another. After a group had inspected the models in one showroom they were asked if they wanted to look at other displays and then invited to a free ride to the garage.


All field men and salesmen were called in by the respective houses to wait on the trade during the 2 days. Scores of sub-agents and independent dealers from all parts of the state came to Milwaukee for the exhibition. Fifty different factories were represented in the show by the thirty-one Milwaukee dealers comprising the association. Many lesser agents not members of the association made special displays, but did not, of course, have the benefit and advantage of the transportation system supplied by the organization and had to be content with as many prospects as free will afforded them.

ROAD CONGRESS IN SEPTEMBER

New York, April 18—The date for the Pan American Road Congress, which will be held at Oakland, Cal., under the joint auspices of the American Road Builders' Association and the American Highway Association, has been set for the week of September 13. An executive committee of five members, of which Governor Charles W. Gates of Vermont is chairman, has been appointed to secure speakers of national and international reputation and highway experts to address the congress. The directors of the Panama-Pacific exposition will be asked to set aside one day during the week as Pan American Road Congress day.



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Published Weekly by
THE CLASS JOURNAL COMPANY
 910 SOUTH MICHIGAN AVENUE CHICAGO

SUBSCRIPTION RATES
 United States and Mexico
 \$3.00 per Year
 Other Countries including
 Canada \$5.00

Entered as Second-Class Matter September 19, 1899, at the Postoffice at Chicago, Illinois, under Act of March 3, 1879

Member of the Audit Bureau of Circulations

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Circulation Audited and Verified December 8, 1914

Increasing Annual Registrations

FIVE states are at present trying to almost double the cost of annual motor car registration, three of these being among the first states in number of motor car registrations, and the others being well up in the list of registrations. This is not unusual. Each year has brought its crop of motor legislation and each year have the motorists banded together to fight what has been considered unfair legislation. This year the excuses for increasing fees are the same as in the past, the necessity for increased revenue. In the early days the registration fee was considered enough if it covered the cost of registration, but today in the majority of states this matter of registration is considered more in the light of a source of revenue, not merely revenue to cover cost.



MOTORISTS who are fighting these increases in fees are finding in some states that while the legislatures are hoping greatly to increase, if not double, the fees, yet they are cutting down appropriations for improving good roads. In fact, in Illinois there is a strong movement to overthrow the present good roads bill. This seems a step in the wrong direction, particularly in a state that stands second in agriculture, as does Illinois. Illinois is notorious for its bad roads, and yet in many parts of the state they are fighting state good roads measures and trying to add to motor car registration.

FROM the motorists' viewpoint it is much more expensive registering a car in Illinois than in New York. Take a car of under 25-horsepower which is registered annually in New York at \$5 and it costs approximately \$16 in Chicago, due to higher state registration and also wheel tax conditions. New York offers its improved roads built on a state-wide scheme, but Illinois has its bad roads coupled with a campaign to try to overthrow any concerted effort to establish a state-wide method of road building. The work of the motorists on legislation is yet far from being over, only a few of the first chapters have been written. As stalwart work remains to be done as has been done in the past, and the need is urgent.



THE annual crop of bills is growing larger in some states year by year; and while the motor clubs are generally not so active as they were some time ago, the burden that the motorists must bear is as important as ever, and it is still imperative that leaders in the motoring circle must not overlook the present crisis, for such it is in not a few states. The old slogan of co-operation is needed more than ever, particularly when the legislation is in some of the larger states, which are taken as examples and which when once legislation is passed, are generally imitated in other states to the advantage of all concerned.

Spring Accident Chapter

LAST Sunday, with its warm sunshine, dry roads, and bright sky in so many parts of the country, started the chapter of motoring accidents in many of the Monday morning papers. These regrettable spring accidents are nearly as proverbial as the "tale that is told," the accidents have been with us every spring for many seasons and will continue to be with us. We cannot altogether stop them, but we can exert an influence that will tend to reduce them.



GENERALLY spring accidents are due to green drivers, out for the first trip with their new cars; or cars that have been laid up all winter and taken out before they were in proper condition, due perhaps to not being overhauled during the winter; or to soft spots or other unknown conditions in the roads, to which the driver was not quite alert. Accidents in springtime are largely due to the driver having gone through a long winter's sleep so far as the finer points of driving are concerned. Driving has been entirely out of the owner's mind, he has been thinking on other matters and when taking his car out for the first trip on a fine spring day fails to remember that he or she is not so accomplished a driver as when the car was laid away last fall. The knack of doing just the right thing takes constant practice.



THIS mental handicap has been directly responsible for some accidents in early spring and it is more than possible that could the truth be known it might explain some of the fatal accidents that must forever remain a secret. One driver told of how he had actually forgotten the gearshift positions on his car, al-

though he had driven it for 2 previous years; and that he narrowly averted an accident by this simple miscalculation.



THE same is true of brakes, particularly when they are not carefully tried out before the car is driven much. Brakes good last fall may be quite different this spring, and already our tale of accidents has grown this year due to failure of the brakes to hold. The steering gear should be gone over in the spring. It may be the many steering connections have not been overhauled since you purchased the car, perhaps the leather boots over the joints have not been taken off. The steering gear should be given a thorough overhauling, first because of the safety factor and second because it frequently does not receive the attention it should.



THE early-spring trip invariably has its long chapter of tire troubles, but few of the accidents can be directly traced to this cause. It will be a good investment to every motorist to have the tires well overhauled by the tire man or garageman. Many, in fact, more than half of the early spring tire troubles can be overcome if tires are gone over. Take the demountable rims off, they may need graphite or other preparations to prevent sticking. The rust must be removed. The inner tubes will be better if taken out, new chalk added and perhaps well cleaned with gasoline, as well as the inside of all casings cleaned. It is so much better to do this in the garage than along the roadside. It is most discouraging to have tire holdups on your spring trip, much more so than later in the season. In line with the safety-first movement of today, the few hours of attention given a car in early spring will prove a real investment both to the pocket book and also to your state of mind.

Naming Country Homes Would Aid Motor Tourists

Movement Along These Lines Starts in Central Illinois

BLOOMINGTON, Ill., April 20—Central Illinois promises to become the pioneer in a movement to name all farm homes, not only for the sentiment attached, but for the guidance of the motorists who now pass along the rural highways in a never-ending procession. Hugh Grieg of Oneida, who is of Scotch descent, has named his farm "Craig-Knowe" as a perpetual reminder of the home of his boyhood. Others are taking similar action and it is believed that the idea will soon become common as its advantages are realized by those who reside in the suburban districts.

To Europeans, it always has appeared strange that so few Americans give a name to their homes in order to distinguish them from others in the immediate neighborhood.

In Scotland, one would as soon expect to find a man without a name as a farm, similarly lacking. Indeed, not only every farm, large or small, but almost every field, is identified by a distinctive appellation. It also may seem strange that in Scotland, farmers, as a rule, are known locally, not by their own names, but by that of the farm which, for the time being, they may occupy.

Is it not vastly more interesting to call a farm "Kildonan," or "Drumsheach," than to designate it as the old Jerry Robertson place, or, as some have suggested, No. 22. With the farms of the United States occupied by such a large proportion of emigrants from Europe, it appears strange that they do not care to recall some isolated farmstead, to memory dear, by Thomas, or Clyde, or Shannon, or Rhine, or Elbe, or Seine.

Could not our Scandinavian neighbors from Gotland, Svealand, or Norrland, give to their vastly more fertile farms, each a name, be it Kolen, Kidkoping, Vetter, Høtøgen, Motala, Tiveden, and countless others which are not and cannot be forgotten by those who spent life's morning in Thor's and Odin's land?

Does a name add anything to the market value of a farm? This question may be asked by the matter of fact farmer when the subject is suggested to him. The answer is, must the rural rank and file leave it to the financial, social, or political 400 of the cities, to have a monopoly in this direction? It is a subject for public congratulation that fortunate possessors of famous houses or extensive landed estates, thoughtfully favor their temporary or permanent home with a distinctive name.

There comes to mind a Biltmore, which became from a comparative waste place, a thing of beauty and a lesson and blessing to all of the surrounding country. In bygone days, we had the Hermitage and Monticello and many others, the mere mention of which recalls interesting person-

ages and equally interesting and instructive pages of colonial and subsequent history. All the world has heard of Mount Vernon. Would it convey the same meaning to the people of this land today, or in the days yet to be, or to freedom lovers in every clime, were it to be known as the old George Washington place or No. 44 on the rural route?

Even the early settlers of New England, serious minded and phlegmatic in their daily affairs, selected poetical names for their homes. From them came Dorchester, Cambridge, Bristol, Norwich, and others, all of which call up a train of memories, sad, or joyous, or perhaps both.

But leaving sentiment wholly out of mind in this day of telephones and rural mail delivery, would it not be exceedingly convenient and a saving of labor, if each farm was given its own name. On many farms, the tenants change every year or so, while in many neighborhoods there are numerous farmers of the same name or with similar names, perplexing, even to the vil-

lage postmaster. And if a distinctive name would be a relief to the postmaster and rural free delivery driver, what would it be to the tourist by motor who traveling by guide book, could make his way swiftly and accurately by simply checking the names of the farm as displayed by a sign attached to the front fence or a tree?

ANOTHER SUBSTITUTE FOR GASOLINE

Ottawa, Can., April 18—After 10 years' of experimenting, Gideon Charbonneau, a scientist of Hull, claims to have discovered a substitute for gasoline which he calls charbo-oil and says he can manufacture in any quantity at a cost of only 4 cents a gallon. During the past week, the fluid was tested before several officials of the Ottawa public works department. Two teaspoonfuls of the liquid, mixed with 2 quarts of water, proved sufficient to run a 2¾ horsepower Gray engine for an hour and one-half without stopping. The fluid does not give off any smoke.

See America First — • • • See America Now



EDITOR'S NOTE—This is the twenty-third of a series of illustrations and thumb-nail sketches of the scenic and historic wonders of America to be run in Motor Age for the purpose of calling the attention of motorists to the picturesque points of interest in their own country.

NO. 23—THE OLD TAVERN AT ARROW ROCK, MO., ON THE SANTA FE TRAIL

One of the oldest and possibly the best preserved antebellum taverns of Missouri is located at Arrow Rock on the Santa Fe trail. The old tavern was built by Judge Joseph Huston in 1850 of bricks made by his slaves on the present site of the structure. Its architecture is characteristic of the early period of the west's development, having old-fashioned fireplaces and windows. The woodwork throughout is of solid native walnut, dressed by hand. Many noted men have been guests at the ancient inn, including Washington Irving, Thomas H. Benton and the Jacksons, and it is filled with relics that recall to the modern motor traveler the pioneer days of almost a century ago.

Rush Work on New York Speedway

Track and Stands to be Completed August 20

NEW YORK, April 20—Special telegram—Work started April 17 on the new Sheepshead bay 2-mile motor speedway and over 200 men are getting the ground cleared away. It is expected that the foundation of the track will be started May 1 and the contract with the builder of the track and grandstands specifies August 20 as the date when these must be completed. As yet no date has been selected for the opening race. The track is to be wood construction and will be 70 feet wide on the straightaways and approximately 76 feet on the curves. The wood used is longleaf yellow pine in 2 by 4-inch pieces laid on edge and running circumferentially or in the same direction as the line of travel of the cars when racing. These planks vary in length, namely, 12, 14, 16, 18 and 20 feet, so as to give lap jointing every place.

The planks are soaked in creosote and the track will have a dark brown appearance. The banking is such that at the curves the outer edge is 25 feet 6 inches above the ground, the claim being made that the banking will permit of a higher speed than Brooklands track. A cross-section of the track on the curves follows a parabolic curve, the same scheme as employed on Brooklands.

On the straightaways of either side, which are practically $\frac{1}{2}$ mile long each, the track is supported on transverse concrete walls 6 feet apart and on the curves it is supported by steel framework.

Safety precautions are being looked after in every respect. There is a 30-inch safety wall of 8-inch concrete around the entire outside of the track and a similar wall at the inside. Between these cement walls and the spectators wide safety zones are arranged for. The main grandstand has accommodations for 30,000 and is a steel structure with a double deck and is located directly opposite the repair pits. Diametrically across on the back stretch is located the bleacher grandstand with a capacity of 25,000. Special facilities are arranged so that there will be no delay in motorists entering or leaving the track and parking spaces.

PEUGEOTS FOR INDIANAPOLIS

Indianapolis, Ind., April 20—In addition to the two Delages to be toolled by Rene Thomas and John de Palma, France will be represented by three Peugeot in the annual 500-mile race to be run on the Indianapolis speedway May 29. The entries, made by the Peugeot Auto Import Co. of New York, were received today and bring the total number of nominations for the classic up to eighteen.

Two of the Peugeot drivers have been selected: Dario Resta, the Anglo-Italian

who captured the Vanderbilt cup and grand prize at San Francisco, and Bob Burman, who has been campaigning with the Peugeot ever since last summer. The third member of the team has yet to be named, but it is thought that the most likely candidate is Arthur Duray, who won second money with the baby Peugeot in the 500-mile race of 1914. Duray is not eligible as cannon fodder and consequently is anxious to compete this year.

The three Peugeot cars represent two entirely different types of motor construction. Resta's car is one of the trio that competed in the 1914 French grand prix, in which it was handled by George Boillot. With an engine of the long-stroke type and measuring 274 cubic inches, it is said to be the fastest mount ever constructed by the Peugeot engineers. The other two cars are babies, similar to that driven by Duray in 1914. They are enfants terrible, however, and able to do 105 miles an hour, and their extremely light weight makes them dangerous in any kind of competition.

Resta will be in charge of the Peugeot team and is planning to establish camp at the speedway immediately in order to have plenty of time to tune up the cars for the race.

The speedway management is looking for the three promised Porter-Knight entries in every mail. They will be driven by Hughie Hughes, Neil Whalen and Chas. F. Keene, who finished seventh in the 1914 race with the Beaver Bullet, and not by Bruce Keene, the former Marmon pilot, as was generally announced.

OLDFIELD SUGGESTS RULE CHANGE

San Antonio, Texas, April 20—Barney Oldfield claims that the American Automobile Association should amend its classification of racing events so as to make a distinction between speedway and road races. He said while here this week:

"Placing a course like that at Corona, Cal., on a par with that of Santa Monica, or Elgin, Ill., is ridiculous. Corona is a speedway, as Indianapolis, in spite of its being a public highway and not fenced in, yet the time made at Corona last year is looked up as the world's official road racing record.

"The course is an almost perfect circle. Its surface is as well paved as any city street. From the beginning to the end of the race it was not necessary to shift gears once, and not once did I vary the pressure of my foot on the throttle.

"Why should a course like this be classed with Elgin or Santa Monica, where the surface is rough, where gear shifts at several turns are necessary? It seems to me that a special classification, perhaps to

be known as 'semi-speedways,' should be made for courses of this kind. Then Santa Monica, Elgin and the other bona fide road courses of the country could offer drivers inducements to break the old world's road racing record of 78.72 miles an hour."

MAY PROTEST MOROSS MEET

Boston, Mass., April 20—Members of the Massachusetts State Automobile Association have threatened to protest to the contest board of the American Automobile Association against the granting of a sanction to Ernie Moross for a dirt track meet scheduled to be run at the Readville track June 17. The local organization takes the stand that the A. A. A. should consult it before giving a permit. It is very antagonistic to barnstorming events as a result of a hippodrome staged at Readville 2 years ago. The local association also has an annual run scheduled for the same day as the Moross meet and claims that the latter may interfere with its tour.

GORDON BUILDING OWN CAR

Los Angeles, Cal., April 18—Huntly Gordon, one of the prominent figures in motor car racing on the Pacific coast during the past season, has sold his Gordon Special, which is the old Mercer Monk, formerly driven by Ralph de Palma and Hughey Hughes and is building a new racer for competition in the 300-inch class. The car is to be known as the Gordon and is almost a reproduction of the Peugeot.

Harry A. Miller, of Los Angeles, inventor of the Master carburetor and Alloyanum, the metal of which Resta's pistons, used in the San Francisco races were made, is working with Gordon on the new car and it is being built in the shops of the Millar Mfg. Co. of this city. The new Gordon will not be completed in time for the Indianapolis race but is to make its first appearance in the Tacoma meet early in July.

GUYOT WRITES FROM THE FRONT

Paris, April 2—Writing from the Argonne district of France, where he is serving as war car driver on the headquarters staff, Albert Guyot says: "At the present time the Argonne track is taking up so much of my time that I am unfortunately unable to come to Indianapolis. I hope to be there next year."

Since the beginning of August, Albert Guyot has been driving the commanding officer of the fifth army corps. During the whole of the winter he has been stationed in the Argonne district, where fighting has been more severe than on any portion of the front. Despite the trying nature of the campaign and the inevitable hardships of a winter spent in the open, Guyot states that the spirit of the French troops is excellent.

"I am proud to be attached to the army in the Argonne section, for this district

will stand out in the annals of the war as the one in which fighting was most grim and murderous," writes Guyot. "All I can say at present is that we have gained a decided superiority over the enemy. The Germans in front of us at this moment are not at all the men we had to deal with in the month of August. We have taken Vauquois, at a heavy cost, it is true, but the victory is one of great strategic and moral value.

"The motor car is rendering inappreciable service to the army. The American trucks have now arrived and are proving entirely satisfactory. Packards in particular are highly spoken of by men who are no novices in motoring matters, and I have several friends in the mechanical transport sections who tell me they have not experienced the least trouble with the American cars."

Having passed the military examination second out of 110 competitors, it is probable that Albert Guyot shortly will be promoted from the rank of sergeant to that of sub-lieutenant and put in charge of motor convoy.

Overland Wins at Oklahoma City

Amateur Event as Opener Provides Thrills

OKLAHOMA CITY, Okla., April 20—Special telegram—Oklahoma's speed carnival opened here today with a 99-mile race for local drivers which was won by an Overland, driven by Claude Foster, in 2 hours, 2 minutes, 3½ seconds. Three other cars finished, R. H. Thomas' Hupmobile taking second, C. S. Shaffstall's Studebaker third, and C. B. Chandler's Buick fourth. The finish was very close, the winner leading by only 30 seconds when the checkered flag dropped.

Two other starters, a Buick and a Mercer, were flagged off the course after the four prize winners crossed the tape. Two cars were eliminated early in the race, a Franklin, driven by J. W. Lee, catching on fire and the Wallace Special, tooled by R. G. Wallace, breaking a pump on the first lap.

Earl N. Swan, driver of the Knox, and his mechanic proved conclusively that they are possessors of charmed lives. The

car first turned over on Jess Willard turn, the sharpest corner of the course, throwing the mechanic 20 feet in the air. The machine was put back on the road but immediately crashed into a tree, again throwing Swan's helper. The Knox was demolished but in neither accident did its crew suffer a scratch.

The course was in bad shape as the dirt portions were cut and filled with holes and the turns were rough. About 10,000 persons witnessed the race. The local meet comes to a close Thursday when the \$5,000 free-for-all, in which several of the speed stars are entered, will be run.

BILLION GALLONS OF GASOLINE

New York, April 16—Gasoline consumption during 1915 will run over 1,000,000,000 gallons, according to an estimate based on the fact that the number of new cars purchased in 1915 is equal to the number purchased in 1914.

Race Drivers on Their Way to the Top

ALTHOUGH he started in pursuit of fame 6 years ago, Arthur Klein first caught up with the elusive damsel about 11 months ago when he started to burn up the bricks of the Indianapolis speedway in practice for the 500-mile race. He attracted the notice of the rail birds who held their split-second watches on him and almost generally agreed that he had a chance to finish inside the money. They guessed wrong for Klein's car, a King that he designed and built at the King factory, was eliminated at the end of 228 miles with a broken valve and piston. He had been going great guns before he went out, however, having averaged 81 miles an hour and making but one stop at his pits.

Immediately after the Indianapolis classic, Klein shipped his car to Tacoma where fame seemed more willing to be courted. He took second in the Golden Potlatch trophy race, finishing 4½ seconds behind Hughey Hughes, who piloted the Maxwell to victory. In the feature event of the Tacoma speed carnival, the Montamathon, Klein was running in second place on his last lap when Bert Dingley, driving the Ono, turned over. The King hit one of the Ono's cushions and ran off the course. Klein got his car back on the road and took third money, a few seconds behind Ruckstell, second place winner. He changed eight tires and a carburetor and but for these costly stops probably would have given Cooper, the ultimate victor, a battle.

After driving the fastest exhibition



ARTHUR KLEIN

mile in the Bert Dingley benefit meet at Los Angeles, Klein took the King to Phoenix and lost the feature event on the track there to Cooper by 4 seconds. He was one of the contenders at Corona for the first 100 miles, averaging 96.3 miles an hour and running in second place. When only 11 seconds behind Pullen, he was forced to retire when a cylinder

cracked. This seemed to presage a series of misfortunes.

Klein has been unfortunate in this year's campaign on the Pacific coast. At San Diego, the King went out at the starting line with a sheared pinion shaft. The K-K combination also failed to take away any prize money from San Francisco, a broken connecting rod eliminating Klein in the grand prize and an empty gasoline tank causing his sudden withdrawal from the Vanderbilt when he was in fifth place and with only one more lap to go. The King was in third place at Venice when it suffered a broken crankshaft.

Although heralded by his press agent as the youngest speed king in captivity, Klein is 26 years of age. He was born in Cleveland, O., and served his apprenticeship in the assembly room of the Peerless factory and as a road tester for the Stearns and Stoddard-Dayton. He drove his first race in 1909 at Atlanta, Ga., where his mount was a stock Stoddard-Dayton. The following year, he was at the steering wheel of a Flanders in a brief barnstorming campaign and in the fall of 1911 and the spring of 1912, drove a Mercer in some dirt track events in Ohio.

Klein quit the racing game in 1912 to go to work for his brother-in-law as a cigar clerk in Youngstown, O. Selling stogies and shaking dice was not speedy enough for him, however, and at the New York motor show of 1914, he decided to don the khaki once more when the King company asked him to design and build a car for the Indianapolis race.

Pittsburgh Safety Code Drastic

Hope to Reduce Number of Traffic Accidents

PITTSBURGH, Pa., April 20—Public Safety Director Chas. T. Hubbard has drawn up a set of motor regulations that will be enforced May 1 and which some motor car owners regard as too drastic.

The abuse of the speed laws and the consequent large number of fatalities, especially to pedestrians, is said to have determined the director to apply stern repressive measures. The order that will practically revolutionize street and speed traffic, thereby reducing the number of deaths and accidents to a minimum, are considered by the thousands of owners of motor cars and vehicles to be the most drastic that have ever been enforced.

Under the new order speed maniacs, it is anticipated by the director, will become a thing of the past within the limits of Pittsburgh. He declares that before the first of the coming month the motorcycle squad will be augmented with twenty more men. This will be for the sole purpose of controlling the speeders, who are warned not to send their cars along faster than a rate of a mile in 2½ minutes.

The taxicab barkers that frequent entrances to cafes in all sections of the city, and theatres, also come in for a hard bump under the new regulations. These explicitly state that "for hire cars and taxicabs will not under any circumstances be permitted to stand in front of cafes or theatres or adjacent thereto." Both Director Hubbard and Superintendent of Police W. Noble Matthews emphatically deny that this feature of the regulations is for the purpose of favoring the calling of cabs from companies by telephone. Private owners, however, seem to be willing to debate this proposition. The authorities say that owners and drivers of livery cars must park them in the designated places or suffer the penalties.

The bright light ordinance, which has been lost since its passage over a year ago, is to be enforced to the letter. This means that the blinding acetylene and electric lamps that bewilder pedestrians and drivers of cars must be dimmed.

The turning of cars between square crossings will be prohibited. This, it is considered, will greatly lessen the number of collisions. All cars must stop close to curb and be headed in the direction of traffic. Violations of any of the above regulations will mean an appearance before a police magistrate. In case this occurs more than twice, a jail sentence will result. Director Hubbard yesterday declared that after his book containing the new regulations is distributed ignorance of the law will not excuse anyone from fine or imprisonment.

Motor cars and all other vehicles shall pass in but one direction in the downtown streets.

The 30-minute parking rule will be more strictly enforced, particularly in the downtown district. Moving vehicles from one location to another in order to defeat it will not be tolerated.

FAIR EXHIBIT DISAPPOINTS

San Francisco, Cal., April 18—Not a few motorists are expressing disappointment at the exhibit of motor cars in the Panama exposition here. Although there is a goodly representation of leading makers, with plenty of space for exhibits, the exhibit is not by any means completely representative of the industry, and while some makers have too much space, others have not enough.

Ford has a complete display, including an assembly plant, which shows a few of the major operations in the assembly of this car, such as mounting the motor, body, adding the radiator and hood and starting the motor by the same method as used in the factory.

The present exhibit cannot be looked upon as an active sales exhibit, such as an annual motor car show. Some of the factory exhibits have men in attendance and in several cases two or more makes are grouped together under the name of the local agent. Little or no trade literature is being distributed and there does not seem to be much demand for it.

At one of the exhibits it was stated that two cars had been sold, but at many others no sales were made and little effort was being made to make sales or get the name of prospects. From what you could judge from a casual observation it would seem that many of the local dealers simply view the exposition as a dead exhibit.

Among those exhibiting are Ford, Overland, Buick, Studebaker, Maxwell, Hupmobile, Cadillac, Jeffery, White, Mitchell, Hudson, Packard, Interstate, Westcott, Kissel, Oakland, Briscoe, Saxon, Moline, Oldsmobile, Pierce truck, Federal truck, Sterling truck and Menominee truck.

TEST AUTOMATIC FUEL CONTROL

Chicago, April 17—Increase in gasoline economy and hill-climbing ability of a Ford car through the use of the Automatic Fuel Control Device was demonstrated in a test conducted yesterday by the technical committee of the Chicago Automobile Club by F. E. Edwards, chairman of the committee. The device in question is arranged to be attached to a carburetor to automatically increase and decrease the flow of fuel, depending on the suction of the engine, and is designed with the idea of providing a more nearly proper mixture at all conditions of engine speeds in low.

In conducting the test the same car and carburetor was used in a series of two trials. One with the device attached and

one without the device. For the economy test a special fuel tank was used and 32 ounces of Red Crown gasoline used in each test. In the economy test the car showed 23.2 miles per gallon without the device and 26.4 miles per gallon with the device. The car used was a regular model T Ford, equipped with Holley carburetor and the regular Ford ignition. The Automatic Fuel Control Device is manufactured by the Automatic Carburetor Co., Chicago.

FORD SETS PRODUCTION RECORD

Detroit, Mich., April 20—A new world's motor car production record was established March 17, by the Ford Motor Co., when at the main plant in Highland Park and in the twenty-one assembling plants in operation throughout the country a total of 2,096 Ford cars were built in 1 day.

This is at the rate of 268 cars per hour on an 8-hour-a-day working schedule. It also means that four and one-half cars were built every minute during the 8 hours of work at the plants that day. To make the March record it was said by the officials of the company that no special arrangements were made and that it results from the increase in the number of men in the main plant here and in the assembling plants, also, in the continual improvements and perfecting of the general working system throughout the factory.

In the plant in Highland Park there were from 16,000 to 17,000 men on the payroll March 17, and there were about 7,000 in the assembling plants of which there are twenty-three now completed but two of which were not in operation on that day. In the assembling plants the men worked 8 hours that day, which is the policy maintained all year. In the main plant in Detroit the shops were in operation 24 hours, which always is the case this time of the year. There are three shifts each of which works 8 hours.

Instead of a total production of 300,000 cars during the present fiscal year which ends August first, the Ford company probably will make the 325,000 it announced recently. Neither the Canadian nor English production is taken into consideration in these figures and the grand total will be 50,000 cars.

It required seven trains of fifty freight cars each to move away the 2,096 cars, six going into a freight car. This was thus at the rate of a trainload an hour. All the cars were shipped in 1 day. If all of these 2,096 cars had been runabouts only the total value of the output would have been \$922,240. Instead there was touring cars, coupelets, sedans, made that day, so that the total value was near \$1,000,000.

COLORADO TOURISTS IN MISSOURI

St. Joseph, Mo., April 19—Missouri gave official greeting to the Pike's Peak-Ocean-to-Ocean highway sociability run this morning when its pilot car, carrying Col. F. W. Buffum, state highway commissioner, and officials of the association, led the

way out of St. Joseph and began the journey across the state on the Hannibal and St. Joseph Cross State highway. After resting over Sunday, the Coloradans were ready to begin the second lap of their journey eastward to Hannibal, Jackson, Springfield, Decatur, Terre Haute, Indianapolis and Chicago.

Hospitable Kansas for 3 days gave welcome to the men from the mountains. In every town, in every hamlet, and even at every cross-roads store the people had come together in large numbers to show their interest in this transcontinental highway and to greet the motorists and to see Chief Manitou give his weird Indian dances.

Of the 675 miles between the Missouri river and Pike's Peak not more than 75 miles are not graded and improved, and of this mileage about 400 miles had been dragged within the few days preceding the coming of the tour.

PAMPELL HEADS LYONS-ATLAS

Indianapolis, Ind., April 16—E. H. Pampell is the new president of the Lyons-Atlas Co., succeeding H. W. Lyons. Mr. Pampell represents interests of great importance in the Lyons-Atlas concern.

PREST-O-LITE WINS AGAINST REFILLER

New York, April 17—In a legal action which differs from others brought by the Prest-O-Lite Co. in that it is a substitution suit against a dealer, this Indianapolis company has secured a judgment by default against the Cut Price Automobile Supply Corp., Boston. It was charged in the United States district court that the dealer had substituted other tanks when customers had asked for Prest-O-Lite tanks. The court ordered the dealer to account for all profits made by the alleged substitution and named a master to conduct the accounting.

"The pith of the decision," states the complainant, "is that substitution under certain circumstances becomes the basis of damage suit against the dealer who practices it." Similar suits have been brought against dealers in Newark, N. J., Detroit, Mich., Jackson, Mich., and Lansing, Mich.

The Prest-O-Lite Co. also has secured an interlocutory decree against Camille and Ida Bournnonville, who trade in Newark, N. J., and who were charged with refilling tanks without removing the Prest-O-Lite label.

NEW BEARDSLEY ELECTRIC ROADSTER

Los Angeles, Cal., April 16—Volney Beardsley, manufacturer of the California-made Beardsley electric, has put a new roadster model on the market. The car has a long hood with imitation radiator, glass front and wire wheels and is good for 30 miles an hour.

Beardsley introduced the car 2 weeks ago by leading one of his monthly tours of Beardsley owners.

Submit Model Jitney Ordinance

Los Angeles Owners Draft Operating Rules

LOS ANGELES, Cal., April 14—Representatives of the Los Angeles Auto Bus Owners' and Operators' Association filed with the city clerk their initiative ordinance petition yesterday. Officers of the association claim that there are 13,333 names on the petition and that they are sure of the five per cent qualified names necessary to place the ordinance before the people at the next general municipal election.

The jitney bus association's ordinance provides for no indemnity bond or insurance and it reduces the license tax from \$60 to \$12 per year. One of the sections defines what vehicles are included in the term "motor bus." Other sections provide for the issuance of permits by the board of public utilities, that the license fee shall be payable quarterly in advance, that the car shall bear on its dash the number of its permit, that the driver's permits shall be issued by the board of public utilities after examination by or under the direction of the board, that the applicant shall be required to demonstrate his or her ability to drive a motor bus through the congested traffic districts of the city, and that the fee for chauffeurs' permits shall be placed at \$1. The same identification provisions as apply to the present ordinance which governs jitney buses and chauffeurs are included in the proposed law; namely, that they must carry their route sign upon the dash while in operation, and must follow a regularly designated route, but can change such route by filing application with the board of public utilities showing the new route proposed.

All jitney buses must be equipped with non-skid tires on the rear wheels and when such tires are worn smooth and when the surface of the street is wet, the rear wheels must be equipped with tire chains. These provisions, however, are not to become effective until 90 days after the ordinance is passed. The petition also provides that owners may substitute one bus for another but if the substitute machine is used consecutively for more than 7 days, the description of the substitute vehicle must be filed with the board of public utilities and notice of the substitution must be carried on the vehicle.

Passengers must not be received or discharged within 35 feet of the intersecting curb line to the right of the driver. Lights must be kept in the covered motor buses back of the driver during the hours of darkness. Drivers must not neglect to return every article left in the buses by passengers and the signs showing the route, terminal and license numbers must be displayed in large letters or figures on the wind shield. It is provided that the jitney buses must not deviate from the route set forth in the permit granted, except to

transport passengers from a public attraction, unless the route extends through the traffic district and in such case the route may be varied.

No more passengers may be carried on the front seat than the regular seating capacity. Passengers must not be allowed to occupy any position forward of the driver.

The board of public utilities is empowered to revoke the license of any operator of a jitney bus who fails to comply with the traffic regulations. Violations of the provisions of the ordinance are made misdemeanors and are punishable by fine or imprisonment not to exceed 50 days or \$50.

It is possible that under this clause, the jitney bus men will still be required to provide for indemnity insurance. In the initiative ordinance there is no reference to indemnity insurance, while the original ordinance has such a provision, requiring a \$5,000 bond. The jitney men's association proposes to attack the validity of the original ordinance at once and this point will depend upon the outcome of the proposed litigation.

SPOKANE CURBS JITNEY SERVICE

Spokane, Wash., April 15—Cheap motor car service was suspended yesterday by order of the police department. All 5 cent fare drivers and a number of other owners of rent machines were forced by the police to suspend operation until they complied with the state law calling for a \$2,500 bond and a state license. Until the drivers of machines have secured permits under the new city ordinance, they will not be permitted to operate in Spokane.

As the taxicab drivers have obtained a temporary injunction to prevent the enforcement of the bonding clauses of the law against them, the taxicab companies have not been molested as yet. The legislation seems to be directed against the jitney operators.

LEGISLATURE AGAINST JITNEY

Phoenix, Ariz., April 18—Ordinances enacted in Tucson and Bisbee, Ariz., at the behest of the local street railway companies, have practically put the jitney buses out of business. Both require each jitney driver to deposit a bond of \$2,500. In Tucson the jitneys, paralleling an electric line for a part of its distance, are compelled to traverse the entire length of the line and also to operate on regular schedule.

In Phoenix the referendum was invoked against a traffic ordinance which would have severely handicapped the jitney drivers, and it has just been repealed by popular vote. It was to require each driver of a rented car to put up a \$2,500 bond and pay an annual license fee of \$60.

Uncle Sam Reports February Exports and Imports

Detailed Statement Showing Growth of Business

WASHINGTON, D. C., April 16—Detailed figures showing the exports of motor cars and parts during various periods were made public today by the bureau of statistics. According to the official returns, the United Kingdom still remains the best customer for American cars. During February last 1,183 cars of all kinds, valued at \$1,688,313, were shipped there, as against 1,269 cars, valued at \$1,017,594, exported in February a year ago. During the 8 months' period ended February, 4,913 cars, valued at \$3,904,239, were exported in 1914, as against 4,631 cars, valued at \$6,447,015, shipped to the United Kingdom in 1915. The big increase in the value of the exports is due to the large shipments of motor trucks made in the last few months.

War Has Effect

France's imports of American cars during February last amounted to 412 cars, valued at \$1,389,599, while in February year ago the number was seventy-two and the value \$49,011. During the 8 months' period the shipments of cars to that country rose from 536, valued at \$410,814, in 1914, to 2,436, valued at \$6,407,087, in 1915.

There were no shipments of cars to Germany in February last, while in February, 1914, the number was 108 and the value \$79,600. The exports during the 8 months' period dropped from 590, valued at \$413,144, in 1914, to sixteen, valued at \$17,364, in 1915.

Italy's imports of American cars numbered sixteen, both in February last and the corresponding month of 1914, but the value decreased from \$12,434, in February, 1914, to \$11,390 in February last. During the 8 months' period the shipments decreased from 211, valued at \$150,144, in 1914, to forty-two, valued at \$35,112, in 1915.

Three hundred and forty-nine cars were exported to Canada, in February last, the value being \$345,733, while in February year ago the number was 292 and the value \$361,895. During the 8 months' period, the exports decreased from 2,055 cars, valued at \$2,940,057, in 1914, to 1,727, valued at \$2,236,426, in 1915.

War-ridden Mexico imported nine American cars in February, 1914, the value being \$10,071, and ten cars in February last, the value of which was \$6,347. During the 8 months' period, the imports decreased from 133, valued at \$217,528, in 1914, to 49, valued at \$54,774, in 1915.

Exports of cars to British Oceania showed a healthy increase during the month's period, the number increasing from 374, valued at \$320,195, in February, 1914, to 526, valued at \$451,706, in February last. However, during the 8 months' period, the shipments declined from 2,516,

valued at \$2,166,771, in 1914, to 1,880, valued at \$1,536,591, in 1915.

Exports to other European countries amounted to 262 cars, valued at \$193,736, in February, 1914, and to 131 cars, valued at \$406,368, in February last, while during the 8 months' period, the figures were 1,151 cars, valued at \$906,827, in 1914, and 832 cars, valued at \$2,300,646, in 1915.

The tabulation of exports for the various periods under consideration, follows:

TOTAL FEBRUARY EXPORTS FOR		
1915 and 1914		
	February, 1914— No.	Value
Motor cars—		
Commercial	57	\$ 83,461
Passenger	2,837	2,378,494
Total	2,894	\$ 2,461,955
Parts (not including engines and tires)		\$ 612,813
Total cars and parts		\$ 3,074,768

	February, 1915— No.	Value
Motor cars—		
Commercial	1,002	\$ 3,022,482
Passenger	2,230	1,785,330
Total	3,232	\$ 4,807,812
Parts (not including engines and tires)		\$ 564,976
Total cars and parts		\$ 5,372,788

	Eight Months Ending February, 1914 No.	Value
Motor cars—		
Commercial	493	\$ 797,722
Passenger	16,890	14,919,087
Total	16,883	\$15,716,809
Parts (not including engines and tires)		\$ 4,222,301
Total cars and parts		\$19,939,110

	Eight Months Ending February, 1915 No.	Value
Motor cars—		
Commercial	4,974	\$14,011,924
Passenger	9,134	7,593,429
Total	14,108	\$21,605,353
Parts (not including engines and tires)		\$ 3,354,222
Total cars and parts		\$24,959,575

EXPORTS BY COUNTRIES		
	February, 1914— No.	Value
Motor cars—		
France	72	\$ 49,011
Germany	108	79,600
Italy	16	12,434
United Kingdom	1,269	1,017,594
Other Europe	262	193,736
Canada	292	361,895
Mexico	9	10,071
West Indies and Bermuda	38	35,854
South America	115	85,244
British Oceania	374	320,195
Asia and other Oceania	199	180,509
Other countries	140	112,812
Total	2,894	\$ 2,461,955

	February, 1915— No.	Value
Motor cars—		
France	412	\$ 1,389,599
Germany	16	11,390
Italy	1,183	1,688,313
United Kingdom	131	406,368
Other Europe	349	345,733
Canada	10	6,347
Mexico	183	98,630
West Indies and Bermuda	132	66,767
South America	526	451,706
British Oceania	131	197,433
Asia and other Oceania	159	145,526
Other countries		
Total countries	3,232	\$ 4,807,812

	Eight Months Ending February, 1914 No.	Value
Motor cars—		
France	536	\$ 410,814
Germany	590	413,144
Italy	211	150,144
United Kingdom	4,915	3,904,239
Other Europe	1,151	906,827
Canada	2,055	2,940,057
Mexico	133	217,528
West Indies and Bermuda	372	348,599
South America	1,463	1,500,584
British Oceania	2,516	2,166,771
Asia and other Oceania	1,468	1,432,323
Other countries	1,475	1,325,779
Total	16,883	\$15,716,809

	Eight Months Ending February, 1915 No.	Value
Motor cars—		
France	2,436	\$ 6,407,087
Germany	16	17,364
Italy	42	35,112
United Kingdom	4,631	6,447,015
Other Europe	832	2,300,646
Canada	1,727	2,236,426
Mexico	49	54,774
West Indies and Bermuda	651	439,642
South America	603	337,452
British Oceania	1,880	1,536,591
Asia and other Oceania	814	1,443,677
Other countries	427	349,567
Total	14,108	\$21,605,353

GASOLINE EXPORTS		
	February, 1914— Gallons	Value
Gasoline—		
Belgium	190,000	\$ 25,650
France	336,907	51,041
Germany	50	13
Italy		
Netherlands	1,400,000	175,000
United Kingdom	4,010,319	458,532
Other Europe	62,880	10,224
Canada	480,504	64,050
Argentina	2,092,243	358,043
Brazil	269,261	51,787
British Oceania	419,900	89,673
Other countries	662,487	122,234
Total	9,924,051	\$ 1,401,247

	February, 1915— Gallons	Value
Gasoline—		
Belgium	2,527,621	244,696
France	1,730,519	224,792
Germany		
Italy	6,904,733	677,620
Netherlands	647,385	72,481
United Kingdom	2,153,089	181,877
Other Europe	633,999	109,798
Canada	1,117,286	133,638
Argentina	510,584	77,272
Brazil	1,037,681	159,465
British Oceania		
Other countries		
Total	17,292,897	\$ 1,931,639

	Eight Months Ending February, 1914 Gallons	Value
Gasoline—		
Belgium	1,925,801	\$ 258,531
France	7,803,603	941,621
Germany	2,280,364	256,287
Italy	1,888,267	257,284
Netherlands	4,000,000	619,000
United Kingdom	13,510,839	1,750,136
Other Europe	3,760,847	611,415
Canada	21,690,676	2,920,606
Argentina	18,007,984	2,239,692
Brazil	5,768,724	1,053,296
British Oceania	5,352,445	1,123,907
Other countries	7,200,518	1,350,205
Total	88,786,868	\$13,381,980

	Eight Months Ending February, 1915 Gallons	Value
Gasoline—		
Belgium	865,928	\$ 104,252
France	22,895,884	2,563,884
Germany	7,245,007	771,313
Italy	1,780,029	152,502
Netherlands	29,074,656	2,942,452
United Kingdom	5,635,307	743,522
Other Europe	24,283,908	2,095,244
Canada	3,689,281	596,226
Argentina	3,288,940	519,797
Brazil	3,088,251	535,079
British Oceania		
Other countries	8,611,524	1,320,977
Total	110,408,715	\$12,344,552

EXPORTS OF TIRES		
	February, 1914	
Tires—		
Belgium		
France		
Germany		
England		
Canada		
Mexico		
Philippine Islands		
Other countries		
Total		\$ 169,174

	February, 1915	
Tires—		
Belgium		
France		
Germany		
England		
Mexico		
Philippine Islands		
Other countries		
Total		\$ 351,546

	Eight Months Ending February, 1914	
Tires—		
Belgium		
France		
Germany		
England		
Mexico		
Philippine Islands		
Other countries		
Total		\$2,051,855

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Eight Months Ending February, 1915

Tires—		
Belgium	6,090
France	
Germany	1,081,141
England	.....	414,392
Canada	.....	65,017
Mexico	.....	157,247
Philippine Islands	.....	536,216
Other countries	.....
Total	.....	\$2,280,103

IMPORTS OF CARS AND PARTS

February, 1914		
	No.	Value
Motor cars and parts of—		
Motor cars	9	\$ 20,575
Parts		62,593
Total	9	\$ 62,593

February, 1915		
	No.	Value
Motor cars and parts of—		
Motor cars	8	\$ 9,061
Parts		29,958
Total	8	\$ 39,019

Eight Months Ending February, 1914		
	No.	Value
Motor cars and parts of—		
Motor cars	230	\$529,359
Parts		397,802
Total	230	\$927,161

Eight Months Ending February, 1915		
	No.	Value
Motor cars and parts of—		
Motor cars	227	\$376,916
Parts		566,913
Total	227	\$943,829

IMPORTS BY COUNTRIES

February, 1914		
	No.	Value
Motor cars—		
France	4	\$ 8,829
Germany	.....	.....
Italy	.....	.....
United Kingdom	2	4,546
Other countries	3	7,200
Total	9	\$ 20,575

February, 1915		
	No.	Value
Motor cars—		
France	2	\$ 4,158
Germany	.....	.....
Italy	.....	.....
United Kingdom	4	3,903
Other countries	2	1,000
Total	8	\$ 9,061

Eight Months Ending February, 1914		
	No.	Value
Motor cars—		
France	103	\$257,592
Germany	15	37,307
Italy	39	58,666
United Kingdom	36	110,222
Other countries	37	65,572
Total	230	\$529,359

February, 1915		
	No.	Value
Motor cars—		
France	38	\$ 91,011
Germany	6	13,606
Italy	90	94,920
United Kingdom	57	137,356
Other countries	36	40,023
Total	227	\$376,916

IMPORTS OF RUBBER

February, 1914		
	Lbs.	Value
India rubber, crude—		
Belgium	1,097,689	\$ 629,244
France	513,615	189,149
Germany	853,934	427,900
Portugal	4,514	1,724
United Kingdom	4,098,605	2,411,875
Central American States and British Honduras	29,958	20,045
Mexico	21,114	14,139
Brazil	2,129,616	841,273
Other South America	20,132	5,985
East Indies	1,279,270	697,326
Other countries	195,471	111,145
Total	10,243,898	\$ 5,349,805

February, 1915		
	Lbs.	Value
India rubber crude—		
Belgium	33,675	17,067
France	.....	.....
Germany	.....	.....
Portugal	.....	.....
United Kingdom	10,581,465	5,345,432
Central American States and British Honduras	67,782	35,051
Mexico	43,455	19,225
Brazil	3,483,244	1,411,623
Other South America	343,127	173,089
East Indies	26,420	10,310
Other countries	898,485	580,484
Total	15,477,653	\$ 7,593,737

Eight Months Ending February, 1914		
	Lbs.	Value
India rubber, crude—		
Belgium	5,973,501	\$ 3,556,693
France	1,677,818	680,131
Germany	4,352,184	2,199,235
Portugal	31,594	10,310
United Kingdom	28,286,917	10,038,286
Central American States and British Honduras	388,281	214,916
Mexico	449,514	235,737
Brazil	23,088,882	9,355,071

Other South America	894,498	470,064
East Indies	8,008,173	5,016,326
Other countries	1,255,089	713,407
Total	74,336,451	\$41,490,176

Eight Months Ending February, 1915		
	Lbs.	Value
India rubber, crude—		
Belgium	1,902,370	\$ 950,872
France	612,889	257,033
Germany	732,118	358,088
Portugal	1,798,119	538,996
United Kingdom	35,849,563	18,329,034
Central American States and British Honduras	389,607	168,540
Mexico	1,254,872	487,497
Brazil	30,175,069	12,406,174
Other South America	2,465,507	1,095,371
East Indies	12,746,417	6,147,760
Other countries	2,524,529	1,546,102
Total	90,481,060	\$42,235,467

DUNHAM LEAVES CHALMERS

Detroit, Mich., April 20—Special telegram—George W. Dunham, second vice-president and consulting engineer of the Chalmers Motor Co., has relinquished his active duties with that company to become a consulting engineer at large with offices in Detroit. He will act in an advisory capacity for any motor car manufacturer. C. C. Hinckley, who has been a designing engineer under Mr. Dunham, becomes consulting engineer of the Chalmers company. Mr. Dunham has had a varied automobile experience, starting with the American Motor Carriage Co. In 1904 he became engineer for the Oldsmobile company, which position he held until 1909, when he became associated with the Hudson Motor Car Co. In 1910 he formed the Chalmers connection, which he has just given up.

EIGHTS BY THE TRAINLOAD

Detroit, Mich., April 17—For the first time in the history of the industry an entire trainload of eight-cylinder motor cars was shipped by one manufacturer. This occurred April 13, when the King Motor Car Co. shipped eighty-five King eights in twenty-eight freight cars to the Chicago distributors, R. J. Morgan and C. F. Woods.

On reaching the Windy City the cars, which had been shipped completely equipped and ready for immediate use, were driven from the railroad station by men and women and a parade through the business district, the loop, was made. This first shipment, the value of which was over \$100,000, is to be followed shortly by another trainload to the same city.

CADILLAC INJUNCTION MODIFIED

Cincinnati, O., April 17—Upon motion of the Cadillac Motor Car Co., Detroit, Mich., the United States circuit court of appeals has modified the injunction which Walter S. Austin, of the Austin Automobile Co., Grand Rapids, Mich., obtained last year against the Detroit manufacturer in his suit for patent infringement covering the construction of two-speed axles.

The modified injunction permits the Cadillac company to use, repair and resell its cars having the two-speed axle, and to furnish parts or repairs for such cars, but does not allow the company to make or sell new cars with that type of axle.

It was also decided that the appeal of

the Cadillac company against the decision rendered against it in this case by Judge C. W. Sessions, in Grand Rapids, Mich., in January, will be heard before the circuit court at the second week of the June session.

GIBSON HEADS MADISON CO.

Indianapolis, Ind., April 17—The Madison Motors Co., with plants at Anderson, was incorporated on Thursday for \$500,000, as announced in Motor Age for April 1. The principal stockholder is C. E. Gibson, former treasurer of the Gibson Automobile Co., and part owner of the Empire Automobile Co. Associated with Gibson and named as directors are W. E. Moore and O. R. Ewing.

At present the company will concentrate its efforts on a six-cylinder car equipped with a Rutenber motor. The body of the new car is of the streamline type. The car has a 118-inch wheelbase and is equipped with Remy starting, lighting and ignition device. A light four-cylinder car of substantial build and low-price is now being finished and within a short time will be ready for the market. The six-cylinder will be produced first, however, it is stated by the officials.

STEWART ACCESSORY CO. SCORES

New York, April 17—The Stewart Accessory Co., Detroit, has been granted a preliminary injunction by Judge Mayer in the United States district court for the southern district of New York in the suit against the American Auto Supply Co., charging unfair competition in marketing tire irons at prices less than \$1 and under various names such as On-in-a-Minute, On-an-Off, etc., which are similar to the name of the Stewart device, Off-and-On.

The unusual point in this preliminary injunction is that the American Auto Supply Co., its agents, etc., are enjoined not only from making a sale or offering for sale such devices as are mentioned in the suit, but also from and after date of granting the injunction, all firms, corporations and persons are enjoined from making, selling or offering for sale such devices under such conditions.

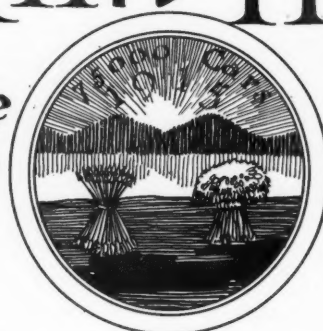
OFFER \$200 FOR KRIT LOT

Detroit, Mich., April 17—Referee in Bankruptcy Lee E. Joslyn, has sent a notice to the creditors of the bankrupt Krit Motor Car Co. that Trustee Frank W. Blair, of the Union Trust Co., has been offered \$200 for the bankruptcy's equity in the real estate upon which the plant of the Krit company is located. The offer will come up for hearing in the referee's office April 27, and will be approved unless a higher offer is then or before that time received. This equity consists of a land contract upon which there remains unpaid about \$140,000. The Russell Wheel and Foundry Co. claim a lien of \$13,000 on the property.

Buckeyes Aim High

Ohio Expects to Take 75000 New Cars for Season of 1915

By J. W. Lehman



COLUMBUS, O., April 16—It has been conceded for years that Ohio is one of the most prosperous and important commonwealths in the United States and its record as a purchaser and owner of motor cars tends to prove that point, if there are any to challenge the statement. The Buckeye state has ranked high for years in the number of cars registered and predictions for the year 1915 indicate that this wonderful development of motor-driven vehicles will be continued.

Growth in Population

As to population, Ohio has shown a remarkable growth in the past 110 years. At the federal census of 1800 the total population of the state was but 45,365, which has been increased by gigantic strides until it numbered 4,767,121 in 1910. During the whole of that period, the increase showed higher percentages. Thus in the period between 1900 and 1910 the increase in population was from 4,157,545 to 4,767,121 or approximately 13 per cent.

Of course, the main increase in the population, especially during the past 20 years, has been in the counties containing the larger cities and towns. Still there is a large rural population in the Buckeye state. In other words, while Ohio might be known primarily as a manufacturing state, its rural production is very important and a large percentage of its people live in the country districts, including the smaller towns and villages.

As an example of that a few counties can be cited. Belmont county, which had 60,875 population in 1900 had increased

to 76,856 in 1910. There are only two rather large towns in the county, which is important for its coal mining. Guernsey county, another devoted to coal mining, increased in the same period from 34,425 to 42,716. Outside of Cambridge, there are no towns or cities of importance. Jefferson county, another of the coal producing counties, increased in population from 44,357 in 1900 to 65,423 in 1910. Steubenville, a city of 22,000 people, is the only urban point of importance. These figures show that the tendency of the population from the rural to the urban districts is not quite as pronounced as in many other states. The tendency is apparent in Ohio nevertheless, and a number of counties which are rural in their nature show a small decrease in population between the two periods.

State a Prosperous One

This large population has been unusually prosperous during the past decade. This is attested by reports of the manufacturing and agricultural industries of the state. It is true that the business depression of the past year has had its effect on general prosperity, but the effect in Ohio probably was not as pronounced as in many other states. Ohio, with her diversified industries has been better able to cope with adversity in business than those states which are strictly devoted to one industry, either manufacturing or farming. The diversity of her industries has been a help in tiding over the period of adversity and will aid in bringing back normal conditions more rapidly.

As a customer for motor cars Ohio always has ranked high. Since the establishment of the car registration department

in 1910, there has been a remarkable increase in the number of motor cars in the state. The records of the department show that 32,941 cars of all kinds were registered in 1910; 45,788 cars in 1911; 63,118 cars in 1912; 86,156 cars in 1913 and 122,504 cars in 1914. This shows an increase of approximately 37 per cent in 1911; 36 per cent in 1912; 41 per cent in 1913 and 61 per cent in 1914. The general average increase for the years mentioned has been approximately 43 per cent.

Registration to be 175,000

Registrar of Automobiles W. H. Walker, when asked to make a prediction of the number of cars to be registered in 1915, stated that he believes the total will reach 175,000 or thereabouts. He is basing his prognostication on the percentages of gain during the past years and also on the fact that up to April 15 of this year, the number of cars registered was 120,500 or almost equal to the records for the entire year in 1914.

These figures tend to show that there has been or will be a market for approximately 75,000 cars in Ohio during the year. If the figures are carried out and all old cars were registered there would be a market for 50,000 cars or more. But statisticians figure that a certain percentage of old cars are worn out, scrapped or sold into other states and thus the figure 75,000 is not believed to be high and possibly is entirely too low.

Thus it is seen that motor car manufacturers have a rich market for their products in the state. Realizing that fact, they have organized sales forces to cover every portion of the state and agencies have been established in cities and towns. Some of the manufacturers have gone so

Source of Ohio's Buying Power VALUE OF FARM PRODUCTS

YEAR	WHEAT Bushels	CORN Bushels	RYE Bushels	OATS Bushels	TOBACCO Pounds
1903	29,074,367	92,820,349	416,735	37,305,993	39,343,870
1904	21,090,222	100,529,653	550,924	58,312,740	49,944,056
1905	32,462,786	108,538,592	813,532	49,731,954	55,332,685
1906	39,279,680	127,044,784	586,269	44,179,782	70,706,878
1907	30,918,367	100,620,205	571,858	33,906,233	56,744,968
1908	28,955,496	102,622,908	613,571	34,363,980	42,330,236
1909	27,393,444	127,218,227	769,914	49,061,678	72,273,052
1910	31,952,274	110,803,783	777,686	49,834,715	67,107,409
1911	30,047,056	112,122,314	716,600	47,837,403	64,678,567
1912	10,856,948	127,726,069	1,138,125	80,146,974	55,828,741

far as to place agencies in the strictly rural sections and these have been quite successful in disposing of cars. Practically every make of cars have sales organizations in Ohio and thousands of motor vehicles have been shipped to the state so far this year.

One of the interesting studies to the distributor and salesman is the distribution of motor cars with reference to the eighty-eight counties of the state. This shows an interesting fact which is probably more pronounced than in other states. This is the heavy buying of cars by the agricultural counties. Of course the counties containing the cities of Cleveland, Cincinnati, Columbus, Toledo, Dayton, Youngstown and others show up well as owners of motor cars, but the proportion of car owners to population also is continued in the counties where farming and stock raising are the principal vocations.

The registration department has completed the work of compiling reports of registration during the year ending December 31, 1914. The report shows the number of cars owned and operated in each of the eighty-eight counties in the state as well as the population of the counties shown in the 1910 census.

In connection with the administration of the office of Registrar of Automobiles the cost of operation is among the lowest in most of the states. It is estimated that the cost is 11.8 per cent of the total receipts. But this does not tell the whole story, as the fees for registration are rather low when compared with those charged in Pennsylvania, California, New York and Iowa. Pennsylvania, which registered but 110,963 cars in 1914, collected \$1,184,645.50 in fees as compared with Ohio which registered 122,504 cars where the total revenues of the department were \$685,457.25. California, where 123,504 cars were registered in 1914, collected fees to the amount of \$1,338,785.25.

State Cost Low

In fact the total cost of operating the department in 1914 was \$81,737.21, which was an increase of \$19,262.89 over 1913, or 30 per cent advance. In purchasing motor car, motorcycle and chauffeur's license tags the state of Ohio has been rather fortunate. The cost of the motor car tags in 1913 was 22½ cents per pair, which cost was reduced to 22 cents in 1914. The contract for 1915 provides for a cost of 20 cents per pair. Motorcycle tags are purchased for 5 cents each and chauffeur's license badges for 7 cents each. A proposition to have all of the tags manufactured by the convicts in the Ohio penitentiary is now being considered by the state officials.

Agriculturally, Ohio stands high in almost every line of production. In 1913 there were 2,901,070 acres of corn planted, which produced on the average 37 bushels per acre or 107,463,240 bushels. The figures for the year 1914 are not yet available, but they are known to be much higher both as to acreage and total production.

The number of acres sown in wheat in the fall of 1913 was 1,758,628 and on the whole the crop was one of the largest in the history of the commonwealth. The reports of the Ohio Agricultural Commission shows that a larger acreage was sown in the fall of 1914, which is estimated at 1,828,267. The outlook for this crop at the present time is excellent and indications are bright for a large crop. Prices on all agricultural products have been high and the farmer has prospered accordingly this year.

In live stock, Ohio has been rich and the sale of fattened cattle and hogs is one of the important sources of income. The total number of cattle reported to the Ohio Agricultural Commission in 1912 was 1,133,550. The number of sheep in the same year was 1,768,017 and the number of hogs was 1,354,861. Wool being one of the most important farm products shows a slight decline over previous years but the total output still is large. In 1912 a total of 12,959,110 pounds was shorn.

Coal a Major Product

As a coal producing state Ohio ranks high. A prolonged strike in 1914 which has not yet ended has curtailed the production of the black diamond in 1914 but in former years the records show a large degree of prosperity. The production of coal in Ohio for 1913 was 36,285,468 tons. The state is outranked in the production of coal only by Pennsylvania, West Virginia and Illinois. In 1912 the total output was 34,450,104 tons; in 1911, 30,759,118 tons; in 1910, 34,209,668 tons; in 1909, 27,939,641 tons and in 1908, 26,270,639 tons. The principal coal producing counties in the state are Belmont, Athens,

Guernsey, Hocking, Jefferson, Perry and Tuscarawas. Belmont, the leading county, produced a total of 10,454,795 tons in 1913.

As a manufacturing state, Ohio is one of the leading commonwealths. She manufactures every conceivable line of merchandise and her export trade during normal times is large. Iron and steel products, farm implements, vehicles, automobiles, tin plate, brick and pottery products, general machinery comprise the principal lines. Her iron and steel industries are some of the largest in the country and hundreds of millions are invested in them.

Rural Field Lucrative

Agencies of the moderate and low priced cars located in Columbus have been devoting considerable attention to the rural districts with good results. According to these men, the market for the lower-priced cars is by far the best in the rural sections. Fords are, of course, the favorite, with Overlands, Buicks, Detroiters, Allens, Empires, Studebakers and other makes coming in close order. In the cities and urban sections there is also a good market for the cheaper cars but there is also a distinctive market for the higher priced vehicles.

In conclusion, it is the general opinion of motor car men that in spite of the general business depression which has overshadowed the country, Ohio shows brilliant prospects for the present year. As a result, preparations have been completed for an active campaign for business and all of the factories and distributors are making a bid for their portion of the 75,000 or more new cars to be sold in the Buckeye state this year.

Registration and Population of Ohio Counties

County	Population	Registration	County	Population	Registration
Adams	24,755	253	Logan	30,084	722
Allen	56,580	1,746	Lorain	76,037	1,808
Ashland	22,975	820	Lucas	192,738	5,425
Ashtabula	59,547	1,371	Madison	19,902	693
Athens	47,705	698	Mahoning	116,151	3,721
Auglaize	31,246	819	Marion	33,971	1,181
Belmont	76,856	968	Medina	23,598	735
Brown	24,832	349	Melms	25,594	232
Butler	70,271	1,791	Mercer	27,536	881
Carroll	15,761	280	Miami	45,047	1,295
Champaign	26,351	694	Monroe	24,244	264
Clark	66,435	1,556	Montgomery	163,763	4,543
Clermont	29,551	325	Morgan	16,097	172
Clinton	23,680	687	Morrow	16,815	431
Columbiana	76,619	1,658	Muskingum	57,488	930
Coshocton	30,121	537	Noble	18,601	182
Crawford	34,036	1,026	Ottawa	22,360	685
Cuyahoga	637,429	19,260	Paulding	22,730	747
Darke	42,943	1,399	Perry	35,396	685
Defiance	24,498	861	Pickaway	26,158	863
Delaware	27,182	708	Pike	15,723	135
Erie	38,327	943	Portage	30,307	779
Fairfield	39,201	1,359	Preble	23,834	1,051
Fayette	21,744	637	Putnam	29,972	857
Franklin	221,567	6,484	Richland	47,667	1,132
Fulton	23,914	1,036	Ross	40,069	860
Gallia	25,745	218	Sandusky	35,171	1,261
Geauga	14,670	366	Seloto	48,463	698
Greene	29,733	764	Seneca	42,421	1,597
Guernsey	42,716	651	Shelby	24,663	808
Hamilton	460,732	7,542	Stark	122,987	3,440
Hancock	37,860	1,589	Summit	108,253	3,951
Hardin	30,407	1,078	Trumbull	52,766	1,389
Harrison	19,076	414	Tuscarawas	57,035	1,113
Henry	25,119	1,015	Union	21,871	633
Highland	28,711	580	Van Wert	29,119	966
Hocking	23,650	347	Vinton	13,096	71
Holmes	17,909	352	Warren	24,497	562
Huron	34,206	1,118	Washington	45,422	560
Jackson	30,791	242	Wayne	38,058	1,006
Jefferson	65,423	1,024	Williams	25,198	1,247
Knox	30,181	863	Wood	46,330	1,880
Lake	22,927	856	Wyandot	20,760	746
Lawrence	39,488	334			
Licking	55,590	1,552			
			Total	4,776,121	122,421

Things Out of the Ordinary in Motordom



WELCOMING BUICK AT PINE KNOT AFTER HAZARDOUS CLIMB. NOTE BOARDS USED AS SNOW SHOES ON REAR WHEELS

LOS ANGELES, Cal., April 16—Using flat boards as snowshoes for the wheels in much the same way as they are used for the German siege guns, enabled a Buick 25 to conquer the snow drifts of Bear valley and repeat its performance of last year by being the first car to enter that almost inaccessible paradise of sportsmen. The valley boasts an altitude of 6,800 feet and to reach it it is necessary to cross a divide of 8,000 feet altitude. The car was driven by Joseph Nikrent and Harry Tuttle, of the Howard Automobile Co.

About 1 month ago Tuttle and Nikrent tried the same stunt, plunging through miles of snow and nearly burying the machine at every 10 or 15 feet. For 3 days they hauled and dug and pulled and shoved but found it impossible to make the goal of their journey. The Buick drivers returned to the city unsuccessful and more or less the butt of jokes sprung by their rivals.

The two agreed that their trouble lay in the fact that the wheels of the machine buried themselves in the snow and refused to do their share of the work and therefore it was necessary to rig up some kind of a contrivance by which they could keep their wheels on the top layer of snow where they could get some traction.

Seeing a photograph of the big German 42-centimeter siege gun which the soldiers

were able to drag through the worst mud and ploughed lands in Europe, Tuttle decided the secret for their success lay in the caterpillar wheels with which the guns were equipped.

Tuttle and Nikrent finally hit upon an arrangement of boards fastened on a demountable rim. Once in the snow, the tires were stripped off the rear wheels and the home-made caterpillars were fastened on. To the great joy of the near-inventors, they were able to get plenty of traction because of the light weight of the car and the good tractive surface offered by the

flat boards. They churned their way slowly up through the valley, in many places if they had had their rear wheels shod with tires they would have sunk nearly out of sight but the caterpillars were life savers. After 3 days of strenuous campaigning, they reached their destination.

GERMANY'S MOTOR CHAPEL

Berlin, April 12—The first chapel to be provided for the German army has just left for the front and is one of a series of three which have been donated by a



FIRST MOTOR CHAPEL BUILT FOR USE OF GERMAN ARMY

Cologne newspaper. Behind the spacious driver's seat, which accommodates two persons, and which even can be used as a couch, there is arranged a folding stretcher which, in case of emergency, enables another bed to be put up in the interior of the car for transporting an invalid.

The inside compartment is accessible through a single door, thus allowing the opposite side to be utilized for the special purpose of the car. On this side there are two sliding upholstered seats, which can be drawn out so as to form a couch. Into the wall containing the door there is fitted a big cabinet for the dress and chasubles of the chaplain, and a smaller cabinet for linen, miscellaneous objects and books. On the front side of the car, there is a folding table serving both as writing desk and wash-stand, as well as another smaller folding table. Above the main seat, there is a rack arranged to be lowered and on which a stretcher can be stowed away at half the height of the car. The latter can thus be used also for the transport of two seriously wounded men, ample space being left for an attendant. At the rear of the car is the altar compartment proper.

The rear of the car is protected by a large folding roof, widened out sideways, which affords full protection to the officiating chaplain against inclement weather. It represents at the inside a firmament showing in the center the eucharistic weapon—a white cross on a red background, surrounded by an aureole. Large red crosses on all sides of the car place it under the protection of the Geneva convention.

UNCLE SAM'S LATEST WAR TRUCK

A traveling wireless station that can do almost anything but shin up a telegraph pole is the latest contribution of Uncle Sam's efficient army officers to the defense forces of this country. Successful experiments have just been concluded at Fort Myer with radio tractor No. 2, which



REMARKABLE PHOTOGRAPH TAKEN WHEN HARRY HARTE, OF LOS ANGELES, "MASTER JUNIOR DRIVER OF THE WORLD," TURNED TURTLE WHILE DRIVING HIS MINIATURE CAR AT CULVER CITY, CAL. HE ESCAPED WITHOUT INJURY

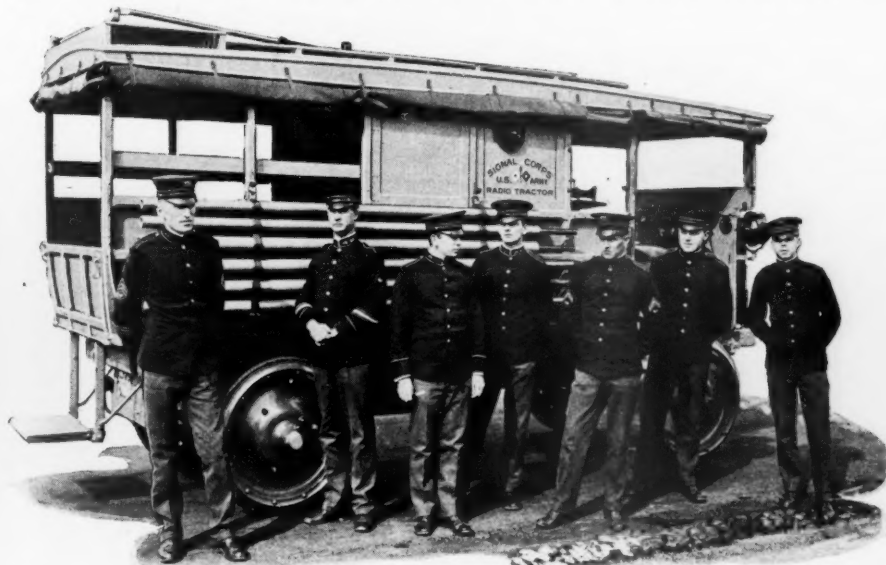
can even travel over the fields when necessary, whereas its predecessor, No. 1, a rear-drive truck, had to confine its peregrinations to the highways of commerce.

Radio tractor No. 2 consists of a motor truck that drives, brakes and steers on all four wheels, and carries a knocked-down army field wireless set. The mast that supports the antennae is 80 feet high when extended, and comprises eight sections of light tubing that are strapped to one side of the truck when not in use. A block and tackle, supported by a collapsible tripod on the roof, is used to pull up the sections one by one in about the same way as the old-fashioned chimney sweep used to join the parts of his elongated broom handle.

The wireless outfit has a sending range of 250 miles under ordinary conditions,

and an almost illimitable receiving range. It is a great improvement on the old hand-operated apparatus that is laboriously toted around on the backs of three pack mules. Moreover, it is not liable to stampede under fire. Of course, the power to operate the sending apparatus is furnished by the truck's own motor, and is made available by simply shifting a lever. This is a great improvement over the old hand-operated sender, and much more powerful. The electric generator is rated at 2 kilowatts, or, roughly, 22 man-power.

This truck is one of a fleet of six Quads in the service of the signal corps.



PORTABLE FIELD WIRELESS OUTFIT USED BY THE AMERICAN ARMY. IT IS MOUNTED ON A JEFFERY QUAD TRUCK AND HAS A SENDING RADIUS OF 250 MILES



Routes and Touring Information



The motor cop is without a job in Fresno county, California. Instead of motorcycle-mounted guardians of the highways, the motorists are placed on their respective honors to observe the laws regarding the speed limit. Signs 10 by 30 feet have been erected over the state highway at each edge of the county telling motorists that the motorcycle policeman had been taken off the job. The traveler is notified by the sign that he is placed on his honor to observe the speed limit and to conduct himself so a return to the cop system will not be necessary. The plan has been received with much favor by all motorists.

MOTORISTS ATTENTION!
YOU ARE ON YOUR HONOR
FRESNO COUNTY HAS NO SPEED COPS
DRIVE SO THEY WILL NOT BE NEEDED
SPEED LIMIT 30 MILES PER HOUR = Board of Supervisors

Telephone Service for Touring Motorists to be Installed in Colorado

DENVER, Colo., April 15—A unique and valuable telephone service for emergency use of motor tourists traveling through a desolate country, similar to a plan suggested editorially by Motor Age several months ago, will be installed this spring across the most lonely stretch of the desert in eastern Utah along the Grand Junction-Salt Lake City division of the Midland trail.

A concern to put through this enterprise, known as the Colorado-Utah Telephone Co., has been organized by good roads promoters of Grand Junction and Mesa County, Colo., with the support of the Grand Junction Chamber of Commerce. Poles for 10 miles of the line have already been gotten out, and construction work will be started promptly, with the expectation of having the most needed 40 miles of service between Mack, Colo., and Cisco, Utah, in working order by June 1.

Connections for portable telephones will be provided about ½ mile apart all along the line, and tourists can secure a convenient instrument at either end of this desert stretch. A deposit covering the cost of the telephone instrument will be required at the station giving it out, and this sum will be refunded when the 'phone

is turned in at the terminal point, less a small rental fee for the use of the telephone.

This will be the first service of its kind known to motorists in this section of the country, and Secretary L. Antles, of the Grand Junction Chamber of Commerce, predicts that it will ultimately be a strong factor in attracting travel over this scenic route, which connects at Grand Junction with two rugged and picturesque motor highways across the Rockies, the Midland trail directly west from Denver and the Rainbow route from La Junta and Pueblo. This telephone service will enable motorists stranded for any reason to get prompt aid from the nearest settlement, and will do much to relieve the anxiety and inconvenience of traversing a lonely and sparsely settled region of this kind. The line ultimately will be extended on westward to Price, Utah, 120 miles farther.

Another substantial assistance for tourists will be provided through the coming season by the Grand Junction people in the way of a constant patrol of this road from the Colorado-Utah line to Cisco, to repair damages done by sudden and heavy storms and to guard against danger of annoying delay due to washouts. This stretch

of road has five wide arroyos difficult to bridge without heavy expense, but easy to cross except shortly after a hard storm. A man patrolling this road with team, wagon, grader, shovel, etc., can speedily repair any ordinary damage of this kind at the banks of these arroyos and make them promptly passable.

Forty-five hundred dollars was spent late last season by the Grand Junction people in repairing this road to Cisco. About 20 miles of road was put into good shape on an old railroad grade, about fifty culverts put in and other improvements made. The Utah people also put in all necessary bridges from Cisco to Salt Lake City. Additional improvements will be made this season, and a scouting trip just finished by one of the good roads workers of Grand Junction found the road in fairly good shape for motoring clear through to Salt Lake City even this early in the spring.

The country traversed by this road is more like the prairies of the middle west than the ordinary conception of a desert, and is skirted by attractive secondary mountain ranges running along from 1 to 20 miles distant from the road.

Answers to Inquiries from Motor Age Readers for Route Information

Iowa to Canada and California

DE WITT, Ia.—Editor Motor Age—I desire the best route from Clinton, Ia., to San Francisco by way of Calgary, Alberta, Can.—C. L. Sadoris.

Suggest that you go west to Cedar Rapids, Ia., 88 miles via De Witt, Grand Mound, Clarence, Cedar Rapids; then follow the Red Ball route north to St. Paul through Vinton, La Porte City, Waterloo, Waverly, Plainfield, Charles City, Mitchell, Lansing, Owatonna, Faribault, Northfield, Farmington, St. Paul, 275 miles. Now drive in a northwesterly direction to Fargo, N. D., over the National Parks trail through Elk River,

St. Cloud, Avon, Albany, Sauk Center, Alexandria, Ashby, Fergus Falls, Barnesville, Fargo. Turn north on to the Meridian road and go due north to Winnipeg, 254 miles, through Hillsboro, Thompson, Grand Forks, Ardoch, St. Thomas, Emerson, Man.; Morris, St. Norbert, Winnipeg.

From Winnipeg west to Calgary, follow the Canadian highway through Portage la Prairie, Brandon, Regina, Moose Jaw, Mortlach, Parkberg, Morse, Waldeck, Swift Current, Webb, Gull Lake, Tompkins, Crane Lake, Maple Creek, Forrest, Walsh, Irvine, Medicine Hat, Whitla, Burdett, Purple Springs, Chin, Lethbridge, Pearce, McLeod; then

north through Claresholm, Stavely, High River, DeWinton, to Calgary. It would be well before leaving Winnipeg to make local inquiry of the Winnipeg Automobile club as to the route and road conditions.

From Calgary retrace your route to McLeod, then go west to Creston, B. C., and on through Trail, Rossland, Priceton, Hope, Westminster, Vancouver.

Following the Pacific highway south to San Francisco, the route is through Blaine, Wash.; Everett, Seattle, Tacoma, Centralia, Kelso, Portland, Ore.; Salem, Eugene, Roseburg, Medford, Ashland, Montague, Cal.; Sis-son, Shasta Springs, Redding, Red Bluff.

Marysville, Sacramento, Stockton, Oakland, San Francisco. Before leaving Vancouver, we suggest that you make careful inquiry as to this route and road conditions, or see the Pacific Highway Association, in the Northern Bank building, Seattle, Wash.

Parsons, Kan.-Oklahoma City, Okla.

Parsons, Kan.—Editor Motor Age—Kindly give me the best route from Parsons, Kan., to Oklahoma City, Okla.—L. R. Davis.

Drive west to Cherryvale; here you meet the Oil Belt route and proceed west on it through Independence, Sedan, Waunata, Cedarvale, Hoosier, Dexter, Winfield. Turn south on the Oklahoma, Texas and Gulf highway and drive 63 miles to Arkansas City; continue south on the Gulf highway for 136 miles to Oklahoma City, passing through Newkirk, Ponca City, Perry, Mulhall, Guthrie, Edmond, Oklahoma City.

Memphis, Tenn.-California

Memphis, Tenn.—Editor Motor Age—Kindly publish and advise where one can secure the best route from Memphis, Tenn., to California, outlining one trip going and another returning different route.—G. H. Hyatt, Memphis Motor Car Co.

Write to the subscription department of Motor Age for a copy of the February 25 issue, price 10 cents, which contains complete information on touring to the Pacific coast, and a three-colored map showing the main routes. From the map you will note that it is possible to follow either the Borderland route to Phoenix, Ariz., and the Ocean-to-Ocean to Los Angeles, and then north to San Francisco; or go to St. Louis, Mo., and use the National Old trails to Kansas City, the Pike's Peak trail to Colorado Springs thence north to Cheyenne, where the road is intersected by the Lincoln highway, on which drive west to San Francisco. Or, should you prefer the mountain route in Colorado, then from Colorado Springs continue on the Pike's Peak trail to Salt Lake City, thence Lincoln highway.

Blue Book, volume 5, gives complete running directions.

Minneapolis, Minn.-Glacier Park

Eau Claire, Wis.—Editor Motor Age—Am contemplating a trip during June from Minneapolis to Fargo, Grand Forks, Glacier park, Yellowstone park and return. Kindly advise where I can procure best information on route with maps.—Charles J. Kepler.

Secure a copy of the February 25 issue of Motor Age and follow the Northwest trail as shown on the three-colored map. Supplement this information with a copy of volume 5 of the Blue Book, which may be purchased of the Blue Book Publishing Co., Chicago. Price \$2.50.

Indianapolis, Ind.-Albany, N. Y.

Northampton, Mass.—Editor Motor Age—Kindly send me route from Indianapolis to Albany, N. Y. Will the roads be good by May 1?—E. P. Harvey.

Routing over the National Old trail to Baltimore, drive first to Columbus, 171 miles, through Greenfield, Cambridge City, Richmond, Lewisburgh, Vandalia, Springfield, West Jefferson; then on to Wheeling, W. Va., 128 miles, passing Hebron, Mt. Sterling, Zanesville, Norwich, Cambridge, Elizabethtown, Wheeling.

Cumberland is next reached through Washington, Pa., Brownsville, Uniontown, Oakton, Md., Grantsville, Frostburg, Cumberland, 133 miles; and then Baltimore, 139 miles, via Hancock, Clear Spring, Hagerstown, Frederick, Ridgeville, Ellicott City, Baltimore.

Leaving Baltimore, drive over a 100-mile macadam stretch through Carney, Bel Air, Havre de Grace, Newark, Wilmington, Chester, and Darby to Philadelphia; thence 97 miles by way of Ogontz, Langhorne, Trenton, N. J., New Brunswick, Metuchen, Rahway, Elizabeth, Newark, Jersey City to New

York, entering it by way of Weehawken—West Forty-second street ferry.

The trip to Albany parallels the Hudson river the entire distance of 147 miles, the way points being, Yonkers, Tarrytown, Ossining, Peekskill, Fishkill Village, Poughkeepsie, Hyde Park, Rhinebeck, Red Hook, Hudson, Kinderhook, Rensselaer. Complete running directions are given in volumes 3 and 4 of the Blue Book.

Forest, O.-Cumberland, Md.

Forest, O.—Editor Motor Age—Kindly give me a good route from Forest, O., to Cumberland, Md., via Salem, O.; also via Columbus, O.—John N. Pfeiffer.

It is a trip of 144 miles to Salem, and in order to reach it drive directly east through Upper Sandusky, Bucyrus, Gallon, Ontario, Mansfield, Wooster, Massillon, Canton, Louisville, Alliance, to Salem.

Routing by the way of Columbus, O., go east to Upper Sandusky, then turn south through Little Sandusky, Marion, Norton, Delaware, to Columbus. Drive east through Irville, Shannon, Dresden, Franklin, Coshoc-ton, New Comerstown, Port Washington, Tuscarawas, New Philadelphia, Canal Dover, Beach City, Navarre, Canton, and east to Salem via Louisville and Alliance. Total distance via Columbus, 252 miles.

Or, from Columbus you might go by way of Pittsburgh, which would take you through Hebron, Zanesville, Cambridge, Washington, Elizabethtown, Wheeling, Elm Grove, Claysville, Cannonsburg, Carnegie, Pittsburgh; then drive northeast through Sewickley, Economy, Rochester, Beaver Falls, Darlington, Unlty, Washingtonville, Salem. This would be a considerably longer trip.

The entire routing is covered by volume 4 of the Blue Book.

To Yellowstone Park and Seattle

Maywood, Ill.—Editor Motor Age—In the Motor Age supplement, February 25, the main highways from New York to San Francisco are shown, and I also notice a cut-off from Ogden to the west entrance of Yellowstone park. From this west entrance there is no road shown to get around to the north entrance at Gardiner. I wish to get on the Northwest trail, which, according to the map, is Gardiner on the north entrance of Yellowstone park. Is there any possible way of getting around there, or what possible route would a person take to get over to Seattle, Wash.—Albert F. Amling.

It is impossible to go around the park from the west entrance to Gardiner. It is possible to reach the Northwest trail from Gardiner by retracing your route as far as Idaho Falls, then going in a northwesterly direction through Payne, Bassett, Roberts, Hawgood, Hamer, Dubois, High Bridge, Spencer, Monida, Snowline, Dell, Kidd, Red-rock, Armstead, and north through Barratts, Dillon, Apex, Melrose and Buxton to Butte, Mont. We cannot give you any information as to the road conditions or running directions. It would be well to make careful inquiry either at Pocatello or Idaho Falls for information on the roads, etc.

Why not go to the eastern entrance, Cody, which can be reached from Cheyenne, Wyo., through Douglas, Thermopolis, and Basin. You will find this the preferred routing because of more direct connections with the Northwest trail. From Cody go directly north through Bridger to Laurel, meeting the Northwest trail at this point, over which proceed westward to Seattle, as shown on the map referred to. Detailed running directions will be found in volume 5 of the Blue Book.

New Orleans, La.-San Diego, Cal.

Woonsocket, R. I.—Editor Motor Age—Kindly inform me as to the best route from New Orleans to Beaumont, Houston, El Paso and San Diego.—N. Mailloux.

Write to the subscription department of

Motor Age for a copy of the February 25 issue, price 10 cents, which contains complete information on touring to the Pacific coast, and a three-colored map outlining the main routes. From this you will be able to make a selection of routes; one going via the Gulf States to Dallas, Tex., the Borderland route and Ocean-to-Ocean highway to San Diego; or, from Fort Worth, north to Newton, Kan., thence west to La Junta, at which point options are again met, your choice depending upon personal desires. Supplement this data with volume 5 of the Blue Book, which can be secured of the Blue Book Publishing Co., Chicago. Price \$2.50.

We have outlined the most direct route, but good alternates with longer mileage, however, would be to go to Omaha from St. Joseph, thence east either by the Lincoln highway to Ames and then north to destination, or the River-to-River route or the Great White Way to Des Moines. Blue Book, volume 5, covers route outlined, as also several alternates.

Le Sueur, Minn.-Ord, Nebr.

Le Sueur Center, Minn.—Editor Motor Age—Kindly give me the best and shortest route from Le Sueur Center, Minn., to Ord., Nebr.—Mayme Beran.

Route to Mankato, 23 miles over a good gravel road, and 175 miles to Sioux Falls, S. D., via Lake Crystal, St. James, Mountain Lake, Windom, Heron Lake, Brewster, Worthington, Luverne, Beaver Creek, S. D., Sioux Falls. This is a good dirt road with stretches of gravel, but will be bad in wet weather.

Drive west 39 miles to Bridgewater through Canastota and Dolton. At Bridgewater turn south onto the Meridian road and route to Columbus, Nebr., 173 miles through Freeman, Yankton, Crofton, Neb., Wausau, Pierce, Norfolk, Madison, Humphrey, Columbus. Leaving the Meridian road at Columbus turn west, heading for Grand Island, 71 miles, through Duncan, and Central City. Ord, Nebr., is but a short run, and at Grand Island make local inquiry as to directions. Volume 5 of the Blue Book covers this routing.

Indianapolis, Ind.-Chattanooga, Tenn.

Crawfordsville, Ind.—Editor Motor Age—Kindly give me the best route from Indianapolis to Chattanooga, Tenn. I have the Kentucky map from the March 11 issue of Motor Age.—A. M.

Leaving Indianapolis route through Franklin, Edinburg, Columbus, Jonesville, Seymour, Uniontown, Crothersville, Scottsburg, Henryville, New Albany, Ind., Louisville, Ky., 124 miles. You will find a good gravel road as far as Uniontown, the balance a mixture of good and poor roads. Follow the routing as to Nashville shown on the Kentucky map, referred to. From Nashville drive 247 miles through Murfreesboro, Shelbyville, Fayetteville, Tenn., Meridianville, Ala., Huntsville, Gurley, Woodville, Scottsboro, Jasper and Chattanooga.

Athens, Ill.-Webster City, Ia.

Athens, Ill., Editor Motor Age—Kindly give me the best route for a motor tour from Athens, Ill., to Webster City, Ia.—A. L. Brittin.

Suggest you go north to Peoria, then to Sterling, Ill., via Milo, Princeton and Van Patten, and west to Clinton, Ia., through Morrison, Unionville, and Fulton; distance 174 miles.

Proceed westward 93 miles to Cedar Rapids via DeWitt, Wheatland, Lowden, Mechanicsville, and Marion; northwest 65 miles to Waterloo, Ia., through Newhall, Vinton, Laporte City, and west to destination 88 miles through Benson, Parkersburg, Aplington, Ackley, Iowa Falls, Wilkie, Webster City.



The Readers' Clearing House



OPERATION OF VACUUM OIL FEED Only Trouble with This Type Usually Due to Air Leaks

MILWAUKEE, Wis.—Editor Motor Age—Please explain and, if possible, illustrate by sketch the workings of the oiler on a 1913 E-M-F 30.

I have trouble with this type of oiler. It will not hold oil and seems to flow right into the crankcase. I repacked all the plugs so as to have no air leak, but still the same trouble continues. As I do not quite understand how the oiler is supposed to operate, I would like to have you give me this information.—H. Tokemueller.

The E-M-F 30 uses what is called a vacuum oil feed or one in which the oil flow is automatically controlled by air pressure. The principle of the vacuum oiling system is shown in Fig. 1. If you were to take a bottle filled with water and invert it over a jar, as shown in the upper illustration, the water from the bottle would flow into the jar and air bubbles would be seen passing through the water in the bottle. The bubbling would cease and no more water would flow, as soon as the mouth of the bottle touched the water level in the jar, as shown in the lower illustration. The ordinary distilled water systems seen in many offices are operated on this principle. To apply this to the oiling system of a motor is simple.

As shown at the left of Fig. 1, it will be noticed the motor crankcase has extending into it a spout which is part of the oil tank of the system. The tank is filled with oil and this, as shown in the upper illustration, runs into the crankcase through the spout. As soon as the end of the spout touches the oil in the crankcase the flow from the tank to the case ceases. This is shown in the bottom view. As the crankcase oil is used the level drops and the moment the spout end is uncovered oil will flow to the case until it is covered.

The only trouble usually encountered

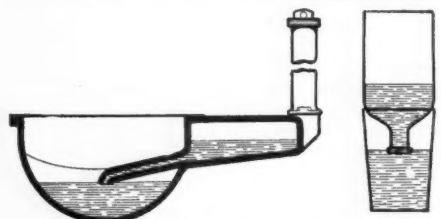
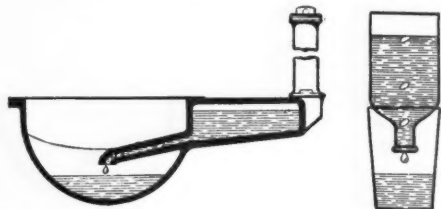


FIG. 1—VACUUM OIL FEED

The upper shows the spout out of the reservoir. Oil will then flow from the tank. With the spout in the reservoir no oil will flow from the tank



Can Save U. S. \$500,000

Tulsa, Okla.—Editor Motor Age—I have a plan for making license tags which will save this country at least \$500,000 every year. My invention consists of a tag which eliminates the necessity of obtaining a new one each year and requires only the changing of that portion which bears the date. This means that motor car owners will retain the same numbers all the time and instead of getting a new license pad each year merely will insert a new portion bearing the new year number. The illustration above shows my new license pad and it is quite clear that the small date-bearing portion can easily be slipped into position and held there by screws. A variety of fastening methods are available.

I believe the advantages of this method will be apparent not only to the state, which will save about two-thirds of the amount now spent for license pads, but will benefit the motorist, the maker and the city governments.

I am under the impression that the cost of a license pad as made at present is 22 cents and under my system this cost will be reduced to about 5 cents. But this is not all, as it will be easier to keep the records when owners have the same number from year to year.—W. M. Fleetwood.

with systems of this sort is due to air leaks either in the tank, around the filler cap, or the pipe running to the crankcase. It also is possible in some that the feed pipes become bent as to alter the fuel level. This might be your case, if you are certain there are no air leaks anywhere about the fuel feeding apparatus.

A PECULIAR MAGNETO AILMENT Misfiring of Motor Hard to Explain—Poor Cables Probable Cause

St. Petersburg, Fla.—Editor Motor Age—I have a four-cylinder motor equipped with a Bosch magneto and Rajah spark plugs. I have had quite a little trouble with the motor misfiring both at high and low speeds. In going over the ignition system carefully, I found that the magneto points break about .015 inch on one side of breaker box and about .018 on the opposite side. I also found that by adjusting the points of the spark plugs in Nos. 1 and 4 cylinders to about .02 inch apart and adjusting Nos. 2 and 3 to .03 inch, that the motor would run perfectly, both at high and low speed. I was surprised to

find that by exchanging the plugs from Nos. 1 and 4 to Nos. 2 and 3 cylinders that the motor would not run at any speed without misfiring. I have tried different adjustments of the magneto points, but always find that better results can be obtained by adjusting the spark plug points accordingly.

I would like to be informed if there is a relationship existing between the adjustment of the magneto points and the adjustment of the spark plug points. In other words, if the magneto has a slightly different break on cylinders 1 and 4 than the break on 2 and 3, can this trouble be overcome by adjusting the spark plug points to suit?—Charles E. McNabb.

The difference of .003 inch in the break of the points on both sides should not make any difference in the motor's operation. A variation even .002 greater than this has been found to cause no irregularities in motor operation.

Under normal conditions, with clean and even points, there is no relation between the adjustment of the magneto breaker points and the adjustment of the spark plug points and Motor Age is inclined to believe your trouble is either in the high-tension cables, to the spark plugs, or in the attachment points at the magneto distributor. Rather than experiment to find the cause it would be better to send the magneto to the nearest Bosch service station and have them examine it. The cost will be slight and it may save much time and trouble later.

OPERATION OF A DYNAMOMETER Machine Is a Dynamo with a Free Field Frame—Used for Testing

Frankfort, Ind.—Editor Motor Age—Kindly give a description of the electric dynamometer and how it works.

2—What advantage has the dynamometer over the Prony brake?

3—Does either take in the amount of work transformed into heat units?

4—Where may I obtain detailed information upon engine and carburetor efficiency tests?—Truman S. Wise.

1—There are many forms of electric dynamometers for use in testing motors for horsepower and torque and a general type is shown in Fig. 2. It consists of a dynamo with a circular field frame F, the frame being mounted freely on ball bearings set in retainers attached to the base of the installation. In other words, the field frame is so mounted that it may swing to a certain extent. The armature shaft of the dynamometer is connected to a motor by means of a universal and when the motor is firing the armature shaft of the dynamometer is revolved. The turning of the armature tends to turn the field frame. The pull exerted is measured by a scale attached to the arm M. N is a balance arm. As is the case with any dynamo whose armature is rotated, current is generated within it and this electricity is dissipated in a lamp bank or other form of load. A tachometer or speed recording instrument is attached to the dynamometer to measure the r.p.m. of the armature shaft. The horsepower is calculated from the following formula

whenever certain readings have been taken.
DSr

horsepower= $\frac{S}{63,025}$

where S is the scale reading
r, the r.p.m. at the time of reading
and D the distance from the point of
scale attachment to the center of rotation
of the armature shaft.

2—The Prony brake is an old form of
power absorption machine and is not as
conveniently handled nor as accurate as
the electric dynamometer.

3—No.

4—The Society of Automobile Engi-
neers, 1790 Broadway, New York, issues
bulletins to its members and from time
to time such information as you wish is
published.

RECONSTRUCTING A THOMAS FLYER Wants Parts for Greater Speed—Don't Know Model—Who Can Help Him?

Rawlins, Wyo.—Editor Motor Age—I own a
Thomas Flyer that I intend to rebuild as a speed-
ster. I was under the impression that I had
bought a model F with a 5 by 6 motor, but I
have just found that my motor has a bore of 5 1/2
by about 6 1/2. Can you tell me what model my
car is, the name of the factory and S. A. E. rat-
ing, etc.?

2—I have to put in new gears for the second
and third speed. Where can I get them?

3—I should like to get maximum power and
speed. Is it advisable to lighten the pistons?
If so, how many and what size holes? Also the
same with connecting rods?

4—Would it be of great advantage to have
larger cams, and where can I get them?

5—Where can I buy a 30-gallon gasoline tank
with a compartment for oil, either new or second-
hand?—Michel M. Rubner.

1—Perhaps you have measured the bore
and stroke improperly, for Motor Age can-
not find listed a Thomas car built in 1910,
1911 or 1912 with the dimensions you give.
In 1910 the Thomas company built eight
chassis, one with a 3 3/4 by 4 1/2 motor, three
with a 4 1/4 by 5 1/2 motor, two with a 5 1/2
by 5 1/2 motor, and two with a 5 3/4 by 5 1/2
motor. In 1911 the Thomas company built
three chassis, two of them with 4 1/4 by 5 1/2
motors and one with a 5 1/2 by 5 1/2. In
1912 one chassis was built with a 4 1/2 by
5 1/2 motor.

2—You can get repair parts for the car
from C. A. Finnegan, care E. R. Thomas
Motor Car Co., Buffalo, N. Y.

3—While it is advisable to use lighter
pistons and rods, the result is best ob-
tained by getting parts made of lighter
material, rather than drilling the old ones.
It takes a good mechanic to properly fit
pistons and rods, because each must be
made to weigh the same as every other
one and the part itself must not be out

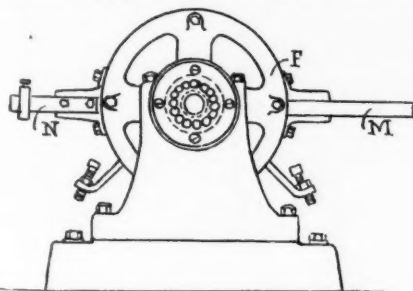


FIG. 2—AN ELECTRIC DYNAMOMETER
Apparatus used for determining horsepower
and torque of motors

One Shot From This Gun Fills a Gearbox With Grease



Filling a differential housing or gearbox in 1 minute may sound like a dream to some
car owners and garagemen who have handled many cars, but it is possible nevertheless accord-
ing to M. S. Walton, manager of the service department of the southern California Maxwell
agency, who has invented a huge gun which holds 30 pounds of grease. The gun, shown
above, allows of a gearcase being filled very easily merely by turning a handle which is part
of the apparatus. A hose attached to the end of the gun directs the grease to the desired retainer.

of balance. You can use pistons one-third
lighter than the present ones.

4—It would not pay to have new cams
made for this motor. In order to get the
best results you will have to get a designer
to lay out cams which will give quicker
opening and closing of the valves, etc.,
and then special cams would have to be
made from his prints. This is expensive
and not worth the time and trouble.

5—Motor Age is sending by mail a list
of concerns who may be able to supply
such a tank.

OILING OF THE MARMON RACER System Differs Only Slightly from Tour- ing Car Method

Cincinnati, O.—Editor Motor Age—Kindly de-
scribe the circulating oiling system as used on
racing cars such as the Marmon, winner of the
500-mile race, and the Sunbeam.—H. W. McNay.

The oiling system used in Marmon rac-
ing cars differs only in minor details from
that used in the Marmon 41 passenger car
and the system used in the latter is illus-
trated in Fig. 3. In this, gear pump 2
draws oil through a screen and forces it
under pressure to the main feed pipe 3.
The main feed pipe conducts oil to each
of the seven main bearings, filling a cir-
cular groove in each. Oil spreads and lubri-
cates these bearings. Oil also is forced
into the hollow crankshaft 4 through a
hole in the shaft constantly registering
with this groove as the shaft revolves.
The crank shaft has a continuous passage
from end to end. At the connecting rod
bearing 5 this action is reversed, the oil
leaving the shaft and filling a groove in
the bushing, whence it is spread over the
bearing surface. A tube, 6, on the con-

necting rod furnishes oil for the piston pin
bushing. The throwoff from the connect-
ing rod bearings lubricates the cylinder
walls and the piston construction prevents
oil from entering the combustion chamber.
The cams and bearings run in a bath of
oil, supplied to the housing from the main
feed pipe, as shown at 8. Tappet rollers,
pins and guides all receive a forced feed
of oil. Hollow tappets, 10, permit a film
of oil to cushion the contact of the valve
stem and tappet. Oil enters the front mo-
tor housing, 11, where it is maintained at
the proper level to thoroughly lubricate
gears and chains. An oil gauge, 12, on the
dash is a constant check on the system.
Pressure may be regulated as desired.

In the Sunbeam a somewhat similar cir-
culating system is used, but after the oil

Questions Answered and Communi- cations Received

H. Tokemueller.....Milwaukee, Wis.
W. M. Fleetwood.....Tulsa, Okla.
Charles E. McNabb.....St. Petersburg, Fla.
Truman S. Wise.....Frankfort, Ind.
Michel M. Rubner.....Rawlins, Wyo.
H. W. McNay.....Cincinnati, O.
A. C. Osborn.....Virginia, Minn.
Albert Stuehm.....Peotone, Ill.
H. A. Mills.....Dresden, N. Y.
J. D. Bradley.....Alabama City, Ala.
Lynn Brothers.....Alice, Tex.
H. F. Stamper, Jr....Wizard Wells, Tex.
Godfrid Kic.....Ramsdell, Tex.

No communications not signed with the
writer's full name and address will be
answered.

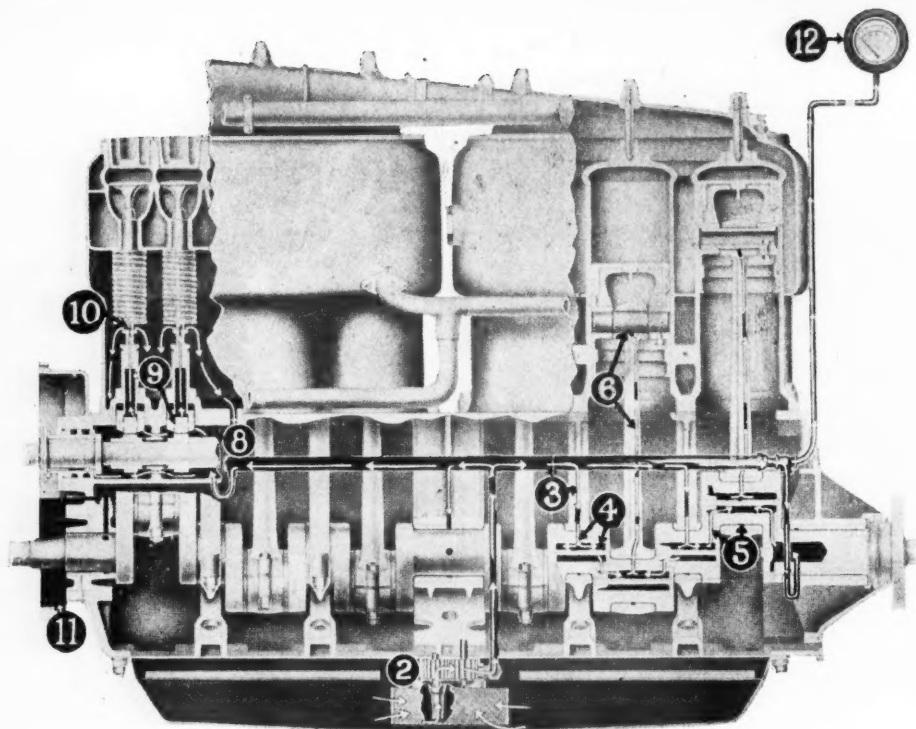


FIG. 3—OILING SYSTEM ON MARMON

Lubricant is forced under pressure to all parts requiring it. The details are described in the text

has circulated through the motor it is passed through long cooling pipes carried outside the car and then returned again to the pump.

TO LIGHTEN PISTONS AND RODS More Speed Desired—Better to Use Lighter Material

Allice, Tex.—Editor Motor Age—What would be the minimum thickness of the top of a 4 1/2-inch piston?

2—Would it be safe for one to drill out part of the web of a connecting rod to make it lighter for the above mentioned size?

3—Will it shorten the life of a piston by drilling to lighten it, or is there any disadvantage in so doing?

4—What company manufactured the planetary transmission used by the Overland company on 1910 models Nos. 40, 41 and 38?—Lynn Brothers.

1—This depends upon the material of the piston. A cast-iron one should be about 1/8-inch thick.

2—This could be done and has been done, but it is much better to get rods of lighter material.

3—You can drill the pistons and get good results. Many racing cars use such pistons. It will be better and cheaper in the end to get pistons of some light material, such as magnalium.

4—This was made by the Overland company.

FOUR-WHEEL DRIVE OPERATION How Jeffery Quad Propels All Wheels—Steers on All

Wizard Wells, Tex.—Editor Motor Age—Kindly explain how the power is applied to the four wheels of the Jeffery truck.—H. F. Stamper, Jr.

The motor power in the Jeffery is transferred to a clutch in the usual way and from it the drive is through a mainshaft with a universal at either end to the gearbox, which is supported amidship upon a cradle formed by the crossmembers of the

frame. The gearset provides four speeds forward and the drive in the gearbox is through a lay shaft to the propeller shaft. From the end of the propeller shaft, as shown in Fig. 6, driving shafts run forward and backward, one to the rear axle and the other to the front axle with universal at either end of each. These shafts are so arranged that they are at an angle of about 4 degrees downward from the gearbox when the truck is under load.

Front and rear axles are alike in every respect and are of the double type, that is, the wheels are carried on a stationary

I-beam axle, which corresponds and is somewhat similar to the front axle of the ordinary car. Above this is the live driving axle which clears the main axle by a sufficient amount to provide room for spring movement. Upon the dead axle is mounted a differential and from it extends the axle shaft whose outer ends carry spur pinions, as shown in Fig. 4, which mesh with an internal or annular gear on the driving wheel. The pinion is mounted on the steering knuckle and each shaft is provided with a universal, which permits an angle of 20 degrees in the shaft.

ADJUSTING HUPMOBILE CLUTCH Simple Method of Doing This Work—Differential Care

Ramsdell, Tex.—Editor Motor Age—How can I adjust the differential on a Hupp Model H?

2—How can I make adjustments of the clutch and what tools will I need?

3—The car has a knock in the wristpins. I renewed them, but it still has the knock. Is there any cheap way of fixing it?—Godfrid Kle.

1—The Hupmobile differential is adjustable, but the work should be done by an experienced repairman, otherwise trouble may result. On either side of the differential assembly is a collar, which is locked in place. With the axle shafts pulled out until a click is heard these collars are turned until the pinion and crown gear are closer in mesh. If the left collar is turned a certain distance the right collar should be turned the same amount.

2—The clutch is of the disk type and inclosed in the flywheel. The spring tension is adjustable by removing the gearset cover and screwing up the nuts A, in Fig. 5, until the necessary tension is obtained. These nuts lock by spring tension every one-third turn. Be sure to screw each nut in the same number of turns, so as to get the same compression on all springs.

To insure smooth meshing and make gear shifting easy, the clutch is equipped

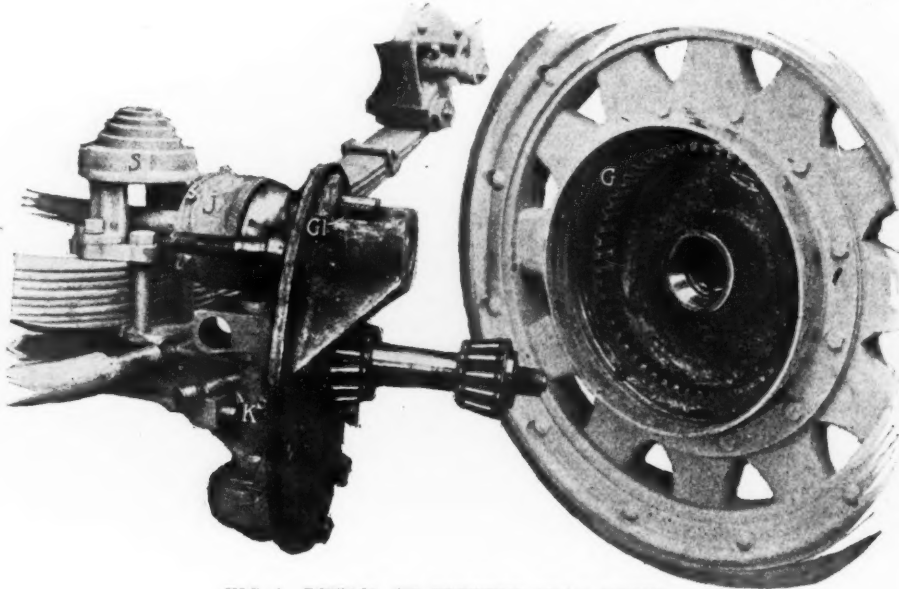


FIG. 4—DETAIL OF JEFFERY QUAD DRIVE

How the driving and steering is accomplished on the same wheel. On the end of the axle shaft is the universal J connected to the pinion G1. This meshes with the internal gear G in the wheel and the whole mechanism turns on the steering knuckle K, the universal turning 30 degrees. The bumper S protects the axle shaft and steering arm in case of spring breakage

with a brake, which acts automatically when the driver disengages the clutch and pushes the pedal a little beyond where the clutch is free. In order to adjust the clutch brake, F, which is necessary if it does not make contact with the clutch follower plate bearing E when the clutch pedal is fully depressed, move the adjusting nut G in a counter-clockwise direction, as indicated by the arrow, until a contact surface is obtained between the brake F and plate E.

3—The trouble may be due to a loose piston. Have a good repairman make a diagnosis.

FEARS WHEELS ARE NOT TRUE Bent Spindle Common Cause of This Ailment—Wants Lunch Kits

Virginia, Minn.—Editor Motor Age—Kindly tell me the best way to true up the wheels on my Case 40 car. I feel that the wheels are not running true.

2—Who makes the most convenient lunch kit to take on trips in a motor car for about six persons? It ought to have plates, cups, knives, forks, spoons, Thermos bottles and lunch space.

3—Does Motor Age consider tire straps, shoes or steel studded tire covers good to use over tires?—A. C. Osborn.

1—Before anything is done be certain that the wheels need truing up. Sometimes all that is necessary is to re-adjust the tie rod, which connects both wheel knuckles. Wobbling front wheels may be caused by a bent axle, bent spindle, partially broken bearing, interior of hub worn, etc. The common cause is due to bent spindles and a good repairman can bend these back in shape.

2—Motor Age is sending you a list of touring lunch box makers.

3—They are usually worth the price paid, because they prevent punctures and blowouts.

HE WANTS PIT ATTENDANT JOB Ask the Team Manager or Race Driver—Where Drivers Live

Peotone, Ill.—Editor Motor Age—Where does Ralph de Palma, Bob Burman, Barney Oldfield and Eddie Pullen make his home?

2—Is there any way for a boy of seventeen to become a pit attendant or to break into the racing game besides working in a factory that enters cars or furnish your own car?

3—Does Motor Age ever publish a review of races and their records?

4—What companies publish books on valve timing and ignition exclusively? On carburetor adjustment exclusively?—Albert Stuehm.

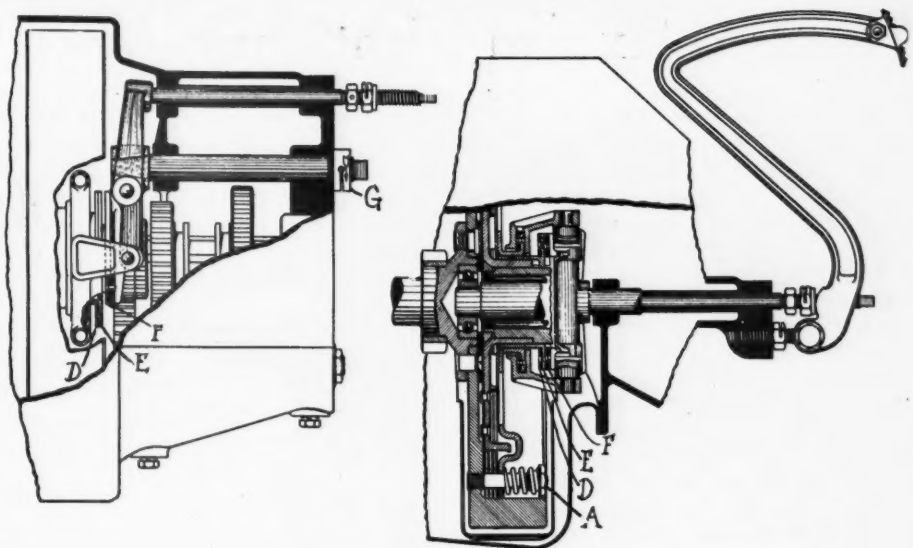


FIG. 5—HUPMOBILE CLUTCH ADJUSTMENTS
The spring tension is altered by the nuts A. The clutch brake is adjusted by nut G, which is turned as shown by the arrow

1—De Palma lives in New York city, Oldfield in Los Angeles, Burman in Jackson, Mich., and Pullen in Trenton, N. J.

2—The only other way is to communicate with a race driver or team manager to find out if he needs attendants.

3—Yes. This is published each year in December. In 1914 the story appeared in the December 16 issue.

4—Motor Age knows of no book which treats of carburetor adjustments exclusively. A good book on valve and ignition timing is "Ignition, Timing and Valve Setting," by Chas. C. Thompson. It is procurable of Motor Age. The price is \$1.

Laws Governing Tourists

Alabama City, Ala.—Editor Motor Age—What is the S. A. E. horsepower rating of the Ford engine? Does this rating apply to Alabama?

2—Does a tourist have to pay any license to travel through a state other than his own? Would a person having a 1915 Alabama license tag incur any additional license expense on a trip to Washington, D. C., on a 6 weeks' trip and return?—J. D. Bradley.

1—The Ford motor is rated at 22.5 S. A. E. horsepower. This applies in all states.

2—Practically all states have a reciprocity clause in their motor car rules gov-

erning tourists. In some states the time limit is short, in others long. You will have to inquire when you arrive in Washington whether 6 weeks is within the limit.

SIZE OF VALVES ON NEW MERCER These Are 2 1/4 Inches Clear Diameter—Horsepower is 70 at 1,850 R. P. M.

Dresden, N. Y.—Editor Motor Age—Explain the use of sal ammoniac in soldering?

2—I have a chance to drive different peoples' cars here in town during the summer. Would it be necessary for me to get a chauffeur's license, as I receive no pay for this work?

3—Where could I obtain a license, and what is the cost in this state?

4—What are the valve sizes and lift in the Mercer model 22-70.

5—At what r. p. m. will the engine show 70 horsepower in the Mercer 22-70?—H. A. Mills.

1—Sal ammoniac is used in soldering as part of the flux. In soldering, sheet brass and copper, for example, it is used in solution with zinc chloride.

2—It is not necessary to have a license unless you receive compensation in some form. This is law in most states.

3—Write secretary of state at Albany.

4—The Mercer uses valves of 2 1/4 inches clear diameter. The lift is 3/8 inch.

5—At 1,850 r.p.m.

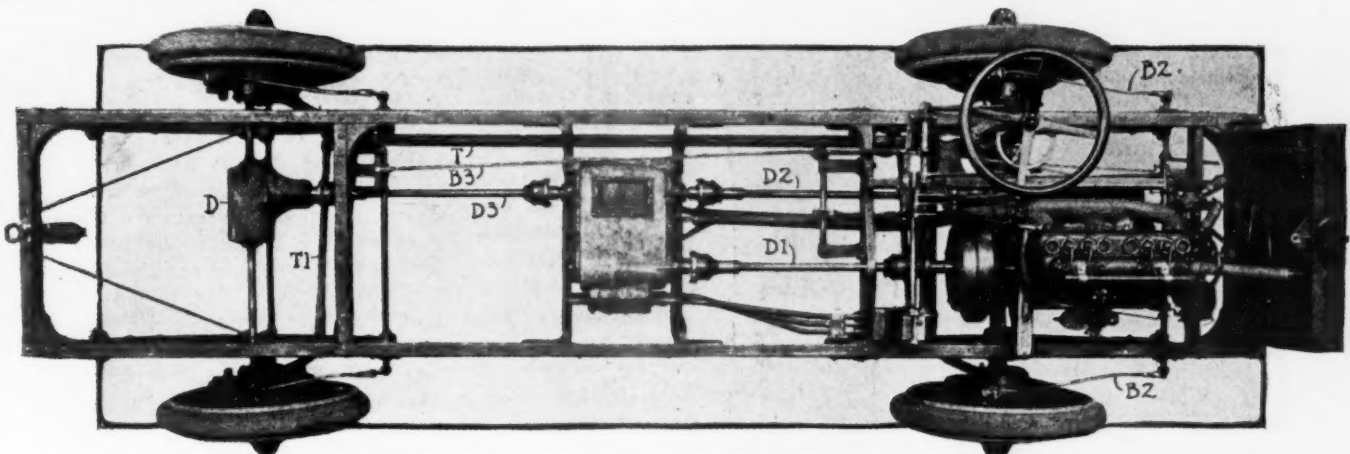


FIG. 6—CHASSIS VIEW OF THE JEFFERY FOUR-WHEEL-DRIVE TRUCK

Plan of Jeffery chassis, showing how the power is transmitted from the motor through the main driving shaft D1 to the gearset, thence to the differential on the front axle through the shaft D2 and to the differential D on the rear axle through the shaft D3. Likewise the steering of the rear wheels is effected through the longitudinal tube T to the cross arm T1. Braking on the rear wheels is accomplished through the rod B3 and on the front wheels through the two rods B2

Standard Six and Eight Built Along Conservative Lines

Prices \$2,100 and \$1,735 Respectively

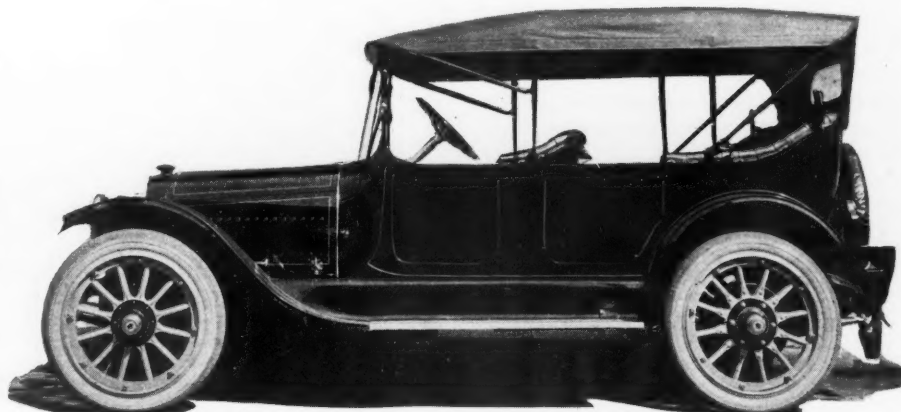
ONE of the large railroad supply concerns, the Standard Steel Car Co., Butler, Pa., which recently announced its intention of marketing six and eight-cylinder motor cars, has already started production of these in small quantities. Assembling has been going on for some time on a \$2,100 six and a \$1,735 eight, both of which have a Herschell-Spillman motor, Warner disk clutch, axle of standard make and Westinghouse starting and lighting equipment. The six wheelbase is 126 and tires 36 by 4½ and the eight wheelbase 121 inches and tires 35 by 4½.

Most noticeable at first glance, is the good bodywork with high finish and harmonious lines. Careful examination discloses no radical features but an excellence of detail that is unusual and there is a well defined practicality about everything. The design is the work of men who have a great experience of the road and the repair shop, so it contains no fads whatever but plenty of those things that make for satisfactory service.

Slight Differences Between Models

There is little difference between the six and the eight, beyond that in the motors which are both Herschell-Spillman, the six being 4 by 5½ and the eight 3 by 5. These dimensions give capacities of 415 cubic inches and 202 cubic inches for the six and eight respectively.

On the six the rear axle is a Weston-Mott with thumb-nut adjustment for the service brake, but the eight has a Timken axle. Both clutch and gearset are products of the Warner Gear Co., Muncie, Ind., the clutch being a disk with Raybestos facing, the gearset being identical for both chassis. Behind the gearset, however there is a difference, as the six has



SIX-CYLINDER MODEL BUILT BY THE STANDARD STEEL CAR CO.

a torque tube with a wide-armed fork anchored to swivels on the frame, while the eight has a simpler construction as shown in the drawings.

A plan view of the chassis shows the tapered form of frame used, and it is interesting to observe that the springs are mounted directly beneath the frame sills, so they also taper towards each other. The makers originally designed the frame to taper, but mounted the springs so that they lay parallel. Experiment showed that there was no disadvantage in allowing the front ends of the springs to be closer together—if anything it might add a little to the lateral stability of the car.

Electrical equipment is Westinghouse two-unit, the combined generator and igniter being employed. The generator is located on the right side of the motor in the six, and the water pump is driven in tandem with it, the coupling attaching to the free end of the armature shaft. In the eight, the same sort of generator is situated in front of the motor. The starting motor in both six and eight, lies on the right side and meshes with the flywheel through the medium of a Bendix drive and there is an especially ingenious control for the starting operation.

At the end of the ignition lever quadrant on the steering wheel there is a sort of trigger which prevents the spark lever from being brought right back to the limit of its possible travel. This trigger is bent over

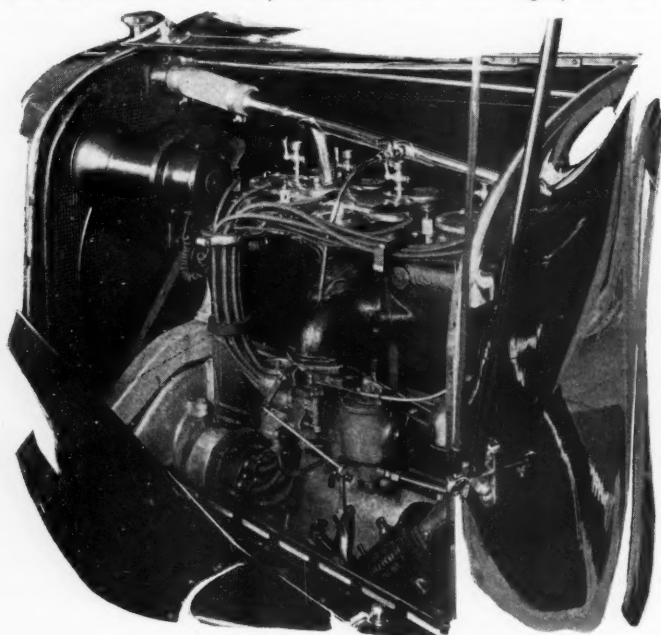
the end of the quadrant, and pressure with the thumb will lift it so that the spark lever arm can slip underneath and come to the extreme end of the quadrant.

At the foot of the steering column, attached to the lower spark lever is a contact which is brought against another, fixed contact, when the trigger is lifted and the spark lever brought right back. It is these contacts that control the starter current, so the switching in of the starting motor is done by the spark lever. This construction has the advantage that it renders it impossible to start without retarding the ignition. With the Bendix drive, although it will withstand backfires, they impose a stress which is not desirable if repeated constantly as it might easily be by a poor driver. The idea of combining the starter switch with the spark lever is thus peculiarly happy since it gives a safeguard while adding to convenience.

How the Car Is Wired

The cowl board, though it appears as part of the body, in the customary way, is really mounted on brackets attached to the frame. The body merely drops over the cowl board and the two parts are joined by a few screws which prevent any chance of rattle. This enables all the wiring to be done under the best possible conditions, out in the open where the whole length of each wire can be seen at once. There is no feeding through holes or screwing to terminals that themselves are out of sight. All wires are contained in copper pipes which are said to be better than flexible tubing, as they are absolutely and permanently waterproof. Since it also carries all other instruments, the cowl board completes the chassis. Any kind of body can be put on, and a body can be taken off without interfering with ability to drive the car.

For gasoline feed, the six has an air pump on the motor, and the eight uses the Stewart vacuum tank, but this completes the list of differences so far as the



MOTOR VIEW OF THE STANDARD SIX

motors are concerned. Another difference is found in the spring suspension, since the eight has half elliptic rear springs while those on the six are three-quarter pattern, and the last point in which one car does not resemble the other is in the spare tire mounting, the eight having running board location and the six a rear end tire carrier.

Eight Simpler of the Two

Summing up it will be seen that the eight, which is the later model, is slightly more simple in several respects, than the six chassis which doubtless accounts for the fact that the eight is the cheaper car.

Of the bodies, the keynote is comfort, combined with smooth exterior, a streamline design without extremes, and the hoods merge nicely into the bodies. All the fittings are of good quality, good upholstery is used and the tops are double thickness Fabricoid that can be washed inside or out with soap and water.

A detail which shows how well the car is cared for in design, is the spring bolt

used in all the shackles. This is hollow and arranged to contain a fair quantity of oil, so that it is necessary to fill it up only every few weeks. The outstanding advantage of supplying oil to spring bushings from inside the bolt, is that it is likely to distribute more evenly than is grease forced into the bushing in the ordinary way. Of course it is more expensive, but in this sort of way, no expense has been spared in the Standard Steel cars.

Of the two cars the six has the longer wheelbase, being 126 inches to the eight's 121, also the tires are 36 by 4½ on the six and 35 by 4½ on the eight. The makers intend the six to take larger and heavier bodies than will be supplied with the eight, though both have the same capacity—seven passengers—in the standard touring types. In the Pittsburgh showrooms there are some fine examples of costly inclosed bodywork on the six-cylinder chassis but so far none of these have been catalogued.

ever, that \$1,000 is the maximum price that will be paid in this rural territory.

While, perhaps, ahead of the game in the number of passenger cars in service, central Illinois has been somewhat backward about investing in commercial trucks. Progress has been slow, due largely to the road conditions and the knowledge that during a large proportion of the year the highways are not passable to motor vehicles when loaded. In the smaller towns, without pavements, the motor wagons are an unknown quantity and probably will be for many years to come. Bloomington is gradually growing into the motor wagon game and the leading 'bus line companies have displaced horses with motor baggage wagons and taxicabs. Many of the dray lines are taking similar action, while the grocers, market men and dry goods firms are ordering the motor wagons and getting rid of their horses. Feed has been unusually high in central Illinois this spring, while the price of gasoline has gone down. This has helped the salesmen in their efforts to dispose of motor vehicles.

Farm Conditions Ideal

Farm conditions in Illinois this spring are ideal for the first time in many years. Very little rain has fallen and the farmers have been able to sow their oats without being in danger of becoming mudbound. In fact, the lack of moisture is creating some concern, for fear that it may be the forerunner of a serious drouth. There was a marked shortage of rainfall over Illinois last year and a repetition might be disastrous. With heavy rains in other states this year, it is safe to assume that Illinois will receive its share later.

Illinois Farmers Want Motor Cars

Record Sales Expected in Larger Cities

BLOOMINGTON, Ill., April 19—Illinois farmers will be in a receptive mood when called upon by motor car salesmen this spring. Men who sell cars are agreed that never before, in their experience, has it been so easy to interest the agriculturists, as this year. Here in Bloomington, which expects to break the record for the largest output of cars of any city in Illinois, outside of Chicago, the salesmen are taking grain quotations in one hand and a catalog in another. They are pointing out to the farmers that it requires but 747 bushels of wheat to buy an \$1,100 car this spring, whereas a year ago it required 1,155 bushels. They also are showing the farmers that this spring it will require but 1,920 bushels of oats to secure a car, while a year ago 2,685 bushels were necessary.

Export Figures an Argument

After these statistics are allowed to assimilate, the prospect is informed that Bradstreet's report showed that in a recent week 7,358,220 bushels of wheat were exported from the United States, while in the corresponding week a year ago the figures were only 2,947,966. During the same week this country exported 16,713,424 bushels of corn, while in the same week a year ago the exportations were but 1,963,352. These arguments are proving effective and can be utilized by any salesman in Illinois.

In the central Illinois territory 90 per cent of the cars sold this spring are going into the hands of active or retired farmers. The men who till the soil appear to be in a position to indulge in cars and most of them are not backward about

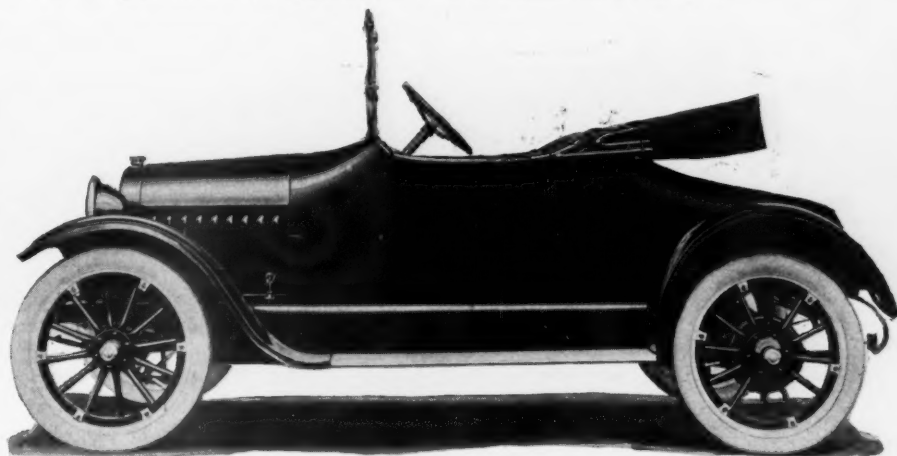
doing so. It is pointed out without possibility of contradiction that every farmer in central Illinois, owning a 100-acre tract and farming it with reasonable success, can afford to own a car when the price of grain is taken into consideration.

Financial experts are confident that the farmers will be prosperous for the next few years at least. Even after the conclusion of hostilities in Europe it will require a long time before the farms abroad can be restored, horses and implements replaced and agriculture restored to the same footing as prior to the war. This means that the neutral countries must furnish the supply of grain temporarily at least and the United States promises to be in a position to supply the bulk of the demand.

While the rush is on for cars in central Illinois, all dealers are actively engaged in attracting patrons. It is apparent, how-

INTER-STATE ANNOUNCES ROADSTER

The Inter-State Motor Co., Muncie, Ind., has added to its former, single chassis line, a new roadster model which is the same as the touring car in mechanical specifications and lists at the same price—\$1,000. The new body seats two passengers and has a large deck in the rear for carrying of spare tires and baggage. The wheelbase is 110 inches and the motor, a Beav-



NEW INTER-STATE ROADSTER, WHICH LISTS AT \$1,000

Interesting Seat Suspension and Gearset on New Cornelian

Improved Car Lists at \$410—Sterling Motor Used

MORE than passing interest attaches to the new model Cornelian car, which is in roadster form only, and of the lighter type. It is made by the Blood Brothers Machine Co., Allegan, Mich. This concern, which for a number of years has been identified with the industry as a parts specialist, began the making of its distinctive roadster type some 3 years ago, and was located in Kalamazoo, Mich., until last year, when the move was made to a new plant at Allegan.

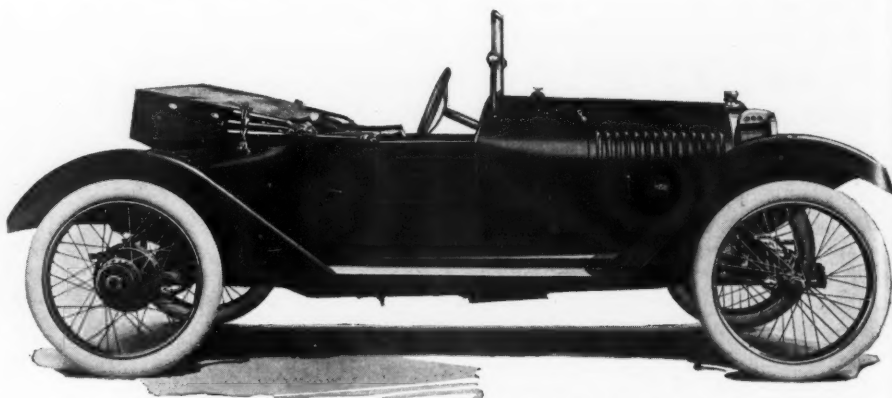
It will be remembered the Cornelian was first brought to the notice of the general public at the time when the cyclecar was at the height of its popularity. But while most of the cyclecars were of narrow tread type, the Bloods stuck tenaciously to the standard 56-inch tread width, which they retain in this latest model.

Selling at \$410, the Cornelian roadster has a Sterling four-cylinder motor $2\frac{3}{4}$ by 4. The clutch is a leather-faced cone; Atwater-Kent ignition is used; a Holley carbureter furnishes the mixture. Other specifications take in a transverse spring system, floating rear axle, left drive, wire wheels, 28 by 3 tires, and wheelbase 100 inches.

Gearset Featured

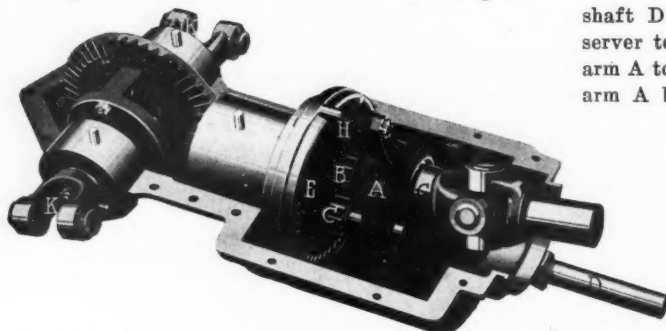
The most unusual features of the car are the gearset, which affords two forward speeds and reverse, with only three gears, and without the use of a countershaft; the absence of a frame, with the body acting in that capacity as well as performing its carrying function; the suspension of the seat on half-elliptic springs independent of the body proper, and the transverse springs, which take the place of the regulation form of axles.

Referring to the illustration, the unusual transmission system with its unique design will be made clear. While this principle



1915 CORNELIAN ROADSTER, WHICH SELLS FOR \$410

has been used by the Bloods since the inception of the car, nevertheless, it is undoubtedly new to a great majority of the motoring public. The entire system is in unit with the rear axle, and consists of a sliding and rocking member which is so mounted as to allow it to be swung from



GEARSET OF CORNELIAN WHICH CONTAINS ONLY THREE GEARS

side to side and thus mesh the desired set of gears.

In the views shown, the sliding and rocking member is at A, and it will be seen that it is fitted with two gears, B and C. The control or shifting rod is at D and driving connection is made through the annular gear E for low speed and reverse. For high speed, or direct drive, the gear B meshes with the small female clutch member F, which is rigidly attached to the carrier of the large annular gear E, and thus drives directly the pinion connecting to the regular form of bevel differential ring gear. When driving direct, the gear B acts as the male member of what might be regarded as a dental clutch, and does not revolve free

of the driving shaft G, but forms a solid drive from this shaft to the bevel pinion.

It will be noticed that the rocking arm A is rigidly attached to the shifter rod D, which is operated from a control lever at the driver's hand. To obtain first speed, the control lever is thrown so as to turn shaft D to the left, considering the observer to be facing forward. This swings arm A to the left also, after which it slides arm A back so that gear B meshes with

the annular gear E, making a driving connection through the two gears to the rear axle. In the top of the arm there is an index pin H, which registers with guide holes in the top of the housing, to make the sliding positive. That is, this pin properly positions the arm so that the meshing will be correct.

When connected gear C is idle.

Now suppose that high speed, or direct, is desired. The control lever first brings the arm A forward, thus unmeshing the gears. Then it is swung so that gear B is in line with the shaft. Pushed back now, the index pin positions it correctly that the dental clutch action may be obtained, gear B being wider than gear C, so that B can slip into the female portion F without interference from gear C, which causes the whole mechanism to revolve together at the same speed.

Action in Reverse

To get reverse, the arm A is swung to the right, and when slid back, gear C meshes with gear E, and the latter is thus turned in the opposite direction from shaft G, through this intermediary gear, the drive being through gear B, which is now clear of the annular gear, to gear C, and thence to gear E.

This change-speed system therefore really employs only three gears, whereas the conventional gearset for two forward speeds and reverse would require at least six gears. This is exclusive of the differential and bevel driving gears. There also would have to be a countershaft in the



SHOWING SEAT SUSPENSION ON THE CORNELIAN ROADSTER

conventional set, the sliding and rocking arm feature of this unusual construction doing away with that also in the Cornelian. The shafts all run on New Departure bearings.

Odd Rear Axle

The rear axle itself is of peculiar construction, making for extreme lightness. It is a floating form and of a type used by De Dion company of France. Just outside of the differential housing each axle shaft is fitted with a universal K. Instead of being inclosed within an axle tube or housing, these axle shafts run open to the wheels. Long transverse springs form the axle proper, two below the axle shafts and one above. These form a platform, which suspends the body. Thus, the universals take care of any slight alteration of the relative position of wheels and differential due to action of the springs. The ends of the springs attach to the wheel hubs and hold up body and driving system at their center.

The front spring suspension is similar to the rear, the transverse springs taking the place of an axle and performing their spring function as well. However, only two springs, one above the other, are used in front, instead of three, they attaching to the vertical wheel spindles at their ends.

While on the question of the springing, the novel seat suspension free of the main body should be mentioned. One of the illustrations brings this out. The seat at both bottom and back is suspended on two long, half-elliptic springs, which act independently of the car springs to make for comfortable riding.

Car Has No Frame

Lightness is further promoted by the entire absence of a frame, the body itself performing that function and making the bridge between the two axles. It is constructed entirely of steel, ribbed and reinforced, and thus has strength enough to take the place of the conventional frame. This feature, together with the axle construction, makes a low center of gravity, it is pointed out, and therefore

reduces the unsprung weight, in this way producing easy riding.

The motor is a standard Sterling type, with overhead valves, and 18-horsepower is claimed for it. It is thermo-syphon cooled, and cylinders are cast in a block. The upper half of the crankcase and the cylinders are in one piece, but the cylinder head, carrying the valves, rocker mechanism and spark plugs, is detachable. The constant level, circulating splash system of oiling is employed, whereby the oil is drawn up by a pump from the reservoir in the bottom of the crankcase and distrib-

uted to the individual splash troughs. The connecting-rod ends dip to these troughs and throw the lubricant to all of the bearing surfaces.

At the price of \$410, the Cornelian has two gas headlights, tail-light, generator, tools, and so on. Electric lights and cranking are extra. The top and windshield add \$25 to the cost.

Deliveries in small numbers are going forward now, it is stated. Cars in reasonable quantities will be coming through the factory in June, and the output for 1915 is to be 2,500 cars, the concern states.

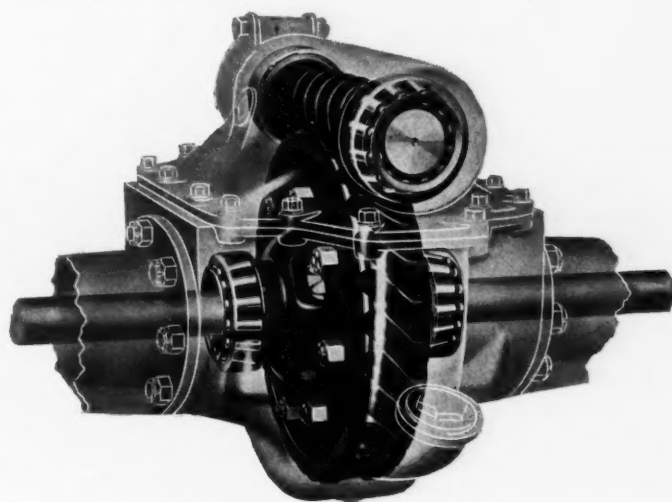
Garford Has New Worm-Drive Model

Capacity 1½ ton; Price Is \$1,800

ANOTHER convert to worm-drive for commercial vehicles is the Garford Motor Truck Co., Lima, O., which has just announced a new \$1,800 1½-ton truck. This is the first time this concern has started production on a model of this type and it differs from the other Garford commercial cars in a few respects aside from the drive. The motor now is under a hood instead of under the driver's cab, but the curved steel dash with inset lamps is remained.

The rear axle is of the floating type and employs a steel worm properly hardened, in mesh with a bronze wheel, the spider gears being conventional bevels. Timken bearings are used through this assembly. The housing is of steel.

In general the new Garford uses a four-cylinder, L-head block motor of 3¾ by



GARFORD WORM-DRIVE UNIT

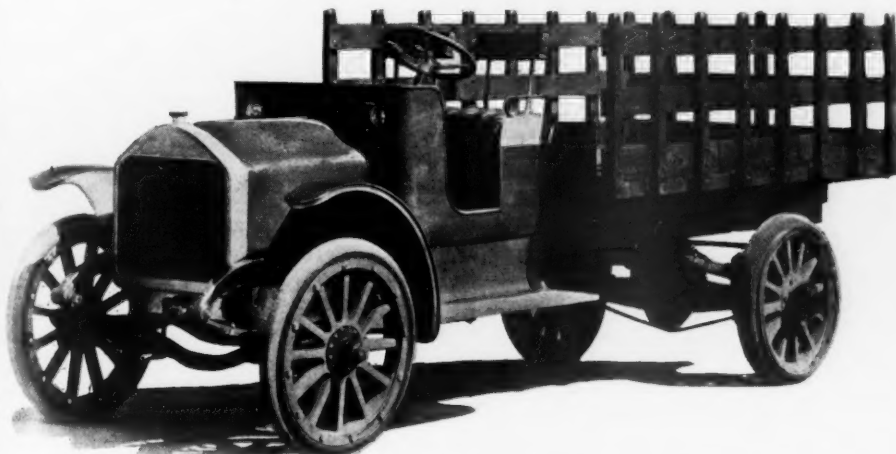
It uses a steel worm and bronze gear. The bearings are Timkens

5½ fitted with a Rayfield carburetor and Splitdorf magneto. Cooling is by centrifugal pump and oiling by a combination force-feed and splash system. In unit with the motor is a dry-plate disk clutch which drives a three-speed gearset located amidships. Four universals are used in the transmission system. Two set of brakes act on the rear wheels drums. Steering, which is by a worm and nut post, may be on either right or left side as desired by the purchaser.

The equipment includes lamps, odometer, driver's cab and cushions, jack, tools, etc. Electric starting and lighting is extra.

ALL DEEDS' TIME FOR DELCO

Dayton, O., April 19—Owing to the growth of the Delco business within the last year or so, E. A. Deeds has been obliged to tender his resignation as vice-president and assistant general manager of the National Cash Register Co., in order that he may devote his entire time to the Delco company, of which he is president. About 1,700 men are now employed in the Delco factory, and over 30,000 complete starting, lighting and ignition systems have been turned out since January 1. By fall, the new building will be completed.



NEW 1½-TON GARFORD WORM-DRIVE MODEL

This is the first car with this type of drive ever announced by the concern

Longer Wheelbase and Improved Exterior on 1915 Stanley

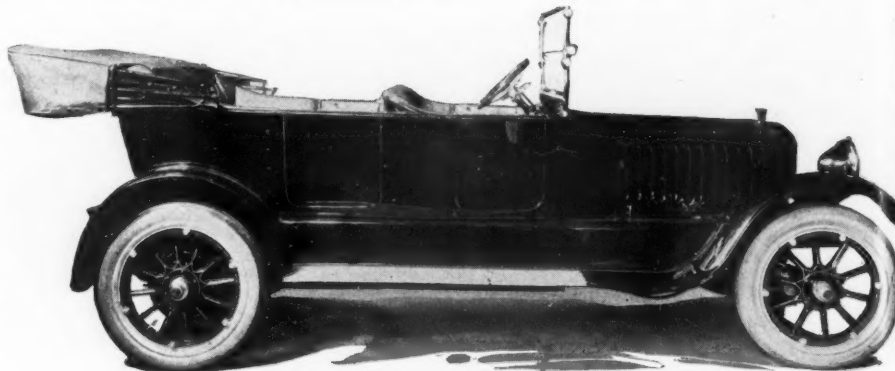
Many Refinements in Mechanical Construction of Steam Car

RECONSTRUCTED exteriorly to match in appearance the more conventional gasoline vehicles of late design, and with an added 10 inches in wheelbase, and a V-shaped honeycomb radiator at the front, the new Stanley steamers for 1915 are announced by the Stanley Motor Carriage Co., Newton, Mass. In spite of this exterior revamping, the fundamental principles of Stanley construction are maintained in the new model, although a great number of refinements calculated to increase the efficiency of the vehicle have been added.

New Burner Used

One of the most important features of the new car is the drill burner used instead of the former slotted type. By the use of this new burner the Stanley company has found it possible to secure 30 per cent more power from the same boiler than that used last season. In fact, it was at first intended to replace the boiler of last year by a larger design, but the new burner has worked out so satisfactorily that the desired amount of power has been secured without any increase in tube surface. It will be remembered that this boiler is a vertical fire tube of 750 1/2-inch tubes.

A minor improvement has been made in the boiler, also, by brazing the tubes on the inside, thus enabling the tubes to carry off a greater amount of heat should they become empty through accident and thereby greatly decreasing the danger of burning out the boiler. The same type of pilot-light system as was employed in the 1914 model 710 Stanley is found in the



NEW STANLEY STEAMER WHICH APPEARS LIKE A GASOLINE CAR

1915 model 720. This is an independent system in which a separate source of fuel is used under independent pressure and under ordinary circumstances will burn for about 4 days without attention.

Another refinement which will be found in the new car is the use of an automatic feed-water control for increasing or decreasing the supply to the boiler. The hand control employed on former Stanleys is continued and the driver is therefore perfectly free to adjust the water supply according to his own ideas. Should he not care to pay any attention to the water level the automatic device will take care of this for him.

It is in the use of the honeycomb radiator that the biggest change has been made. By the successful employment of this type of condenser the car may travel 200 miles on one filling of the 24-gallon water tank. Last year the amount of water carried for a trip of this length was

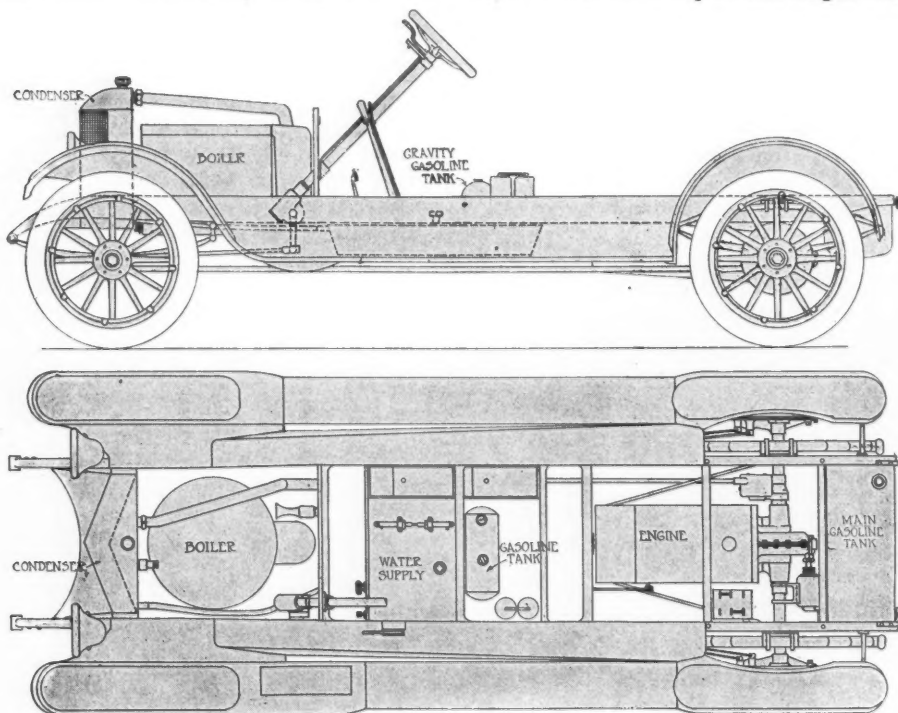
considerably greater thereby adding much to the weight of the car. The successful use of a radiator condenser has been a stumbling block in the way of steam-car designers for a long time due to the fact that since the lubricant is introduced into the cylinders it is naturally carried with the steam exhaust into the radiator, forming a deposit on the interior surface of the cooling medium, thereby rapidly cutting down its efficiency and soon clogging the entire system.

Lubrication by Graphite

The method by which this difficulty has been solved is in the use of a graphite lubricant in which the graphite is carried in a deflocculated condition. In addition to this only enough oil to prevent the cylinders from rusting is introduced, 1 gallon sufficing for about 500 miles.

Owners of former models of Stanley steam cars will not note a great difference in the control except that it has been shifted to the left side in response to public opinion as exemplified in the greater number of cars now on the market. The steering gear is a new Warner design this season and the brakes are 14 by 2 inches, which is a larger size, although the car is said to be of less weight due to the use of an aluminum body, the carrying of only 24 gallons of water instead of 40 and the lighter construction in the body itself. Another feature of the new model is the use of the Splittorf-Apelco system for electric lighting. A very simple installation of this has been made as it has been geared directly to the differential, thereby adding only one moving part, the armature of the dynamo.

Another departure from previous Stanley practice is to drive the pumps for fuel and water from the rear axle instead of from the engine. A more efficient pump has been secured and one in which noise has been eliminated by having a longer stroke at one-quarter engine speed. The changing of the pumps was not due, however, to difficulty with the engine installation used last season, but was a necessity to meet the changed position of the water tank



SIDE AND TOP VIEWS OF THE 1915 STANLEY STEAMER

which is mounting the engine thought of plain in the construction for The above most practice other de For t construction Motor C passenger ger tour is rated the char power p tion of tion of cutoff. for abo nary ru mainder links a mitted There a the Ste Engine, The v inches, ator, it the fra shorter model engine and is gine ba unit of axle. T in that form m rods th The v tial an by a tl of the p lating steel an and ell on Tim a comp In o medium lowing passes thence steam expand gine p densed ing int steam latter An o tank a escape set at unit fr interna ordin

which is considerably lower, due to its mounting underneath the condenser. In the engine itself only one change has been thought wise, and this is the installation of plain bearings instead of ball bearings in the cross-head. The Stevenson link motion for the valve has been continued. The above review of the changes are the most radical departures from previous practice although throughout the chassis other detailed refinements will be noted.

For the general facts of Stanley construction it may be noted that the Stanley Motor Carriage Co. builds but one type of passenger car, this being the five-passenger touring type illustrated. The engine is rated at 20 horsepower, although due to the characteristics of the steam-propelled power plant, horsepower is merely a question of steam pressure and torque, a question of the steam pressure and point of cutoff. Steam is admitted to the cylinder for about one-quarter stroke during ordinary running and expanded for the remainder of the strokes. In starting, the links are shifted over and steam is admitted for practically the entire stroke. There are only two positions utilized on the Stevenson link motion in this engine.

Engine, Differential and Axle a Unit

The wheelbase of the new design is 130 inches, but, due to the use of the V-radiator, it has been found possible to narrow the frame at the front end, allowing a shorter turning radius than the previous model which was 10 inches shorter. The engine is bolted rigidly to the rear axle and is braced from the front of the engine back to the mounting, thus making a unit of the engine, differential and rear axle. The suspension of the car is unique in that the body rests on a built-up platform made up of the two axles and perch rods through which the drive passes.

The unit formed by the engine differential and rear axle is attached to the car by a three-point suspension method, each of the points of attachment being an oscillating bearing. The frame is of channel steel and the springs are semi-elliptic front and elliptic rear. The rear axle is carried on Timken bearings and the front is also a complete Timken unit.

In operation, the water, which is the medium of power, passes through the following cycle. From the water tank it passes through the feed-water heater, thence to the boiler and in the form of steam passes into the cylinder where it expands. The exhaust steam from the engine passes into the radiator and is condensed there, the water immediately draining into the tank below, so that when the steam ceases to pass into the radiator, the latter becomes empty and dry.

An overflow pipe in the top of the water tank allows any steam coming into it to escape and on the radiator a blow-off valve set at a very low pressure prevents this unit from being subjected to any injurious internal pressure. While running at an ordinary speed on fairly level roads, very

little steam is ejected from the water tank.

The price of the model 720 complete with full equipment is \$1,975. The body is an aluminum five-passenger fore-door design. The doors are 19 inches in front and 20 inches rear. The front seat is 44 inches wide and 18 inches front to rear. The cushions are 8 inches deep. The rear seat is 48 inches wide, 20 inches

from front to back and has 10-inch cushions. The tonneau space is 30 inches from the back of the front seat to the front of the back seat. A one-man top, side curtains, clear-vision windshield, and the electric lighting system with a Willard 6-volt 80-ampere battery and a full set of lamps are included with the equipment. The body and wheels are a dark blue with fine gray striping.

Oakes Horn-Fan-Pump for Fords

Heinze Has Ford Magneto Horn

UNIFICATION of motor parts seems to have been carried to its limit in a combination cooling fan, tire pump and horn, the three-in-one accessory having just been announced by the Oakes company, Indianapolis, Ind., which up to this time has combined only fan and horn. While designed for Ford cars exclusively, this new fitment is supplied for other makes upon which installation can be made without difficulty. The latest Oakes product uses a Beartone fan-horn, the shaft of which drives a single-cylinder, fin-cooled, air pump by means of a worm gear, as shown herewith. The pump has a bore and stroke of $1\frac{1}{2}$ by $1\frac{1}{4}$ and is an all-metal design using wick oiling. To insure proper lubrication the hub of the fan is cored out to hold a supply of grease for the bearings. A cup on the bracket allows of the fan being lubricated while in motion. An automatic gauge is provided which when set at a certain pressure causes the tire to be pumped to that pressure, exhausting all excess air. Sufficient hose also is supplied.

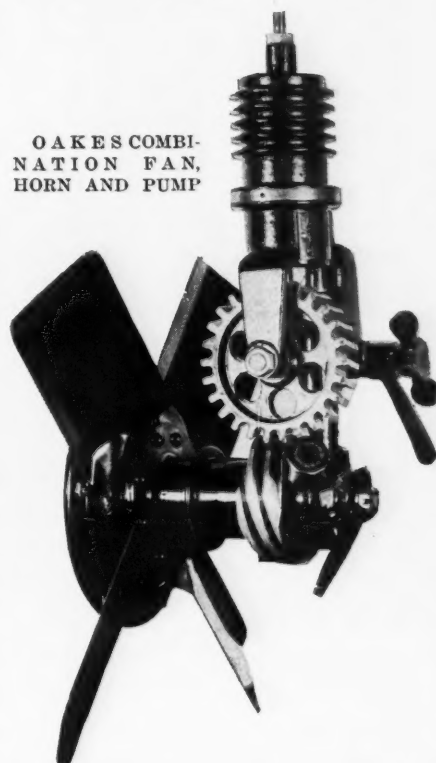
This unit may be mounted on a Ford car in about 10 minutes, it is claimed, for all that is necessary is to dismount the present fan assembly and substitute the Fan-Horn-Pump. Pressure on a lever is used to throw the pump into operation and the horn is operated by button pressure. Price is \$12.50 complete.

MAGNETO HORN FOR FORDS

An electric horn which operates on the current generated by a Ford flywheel magneto is offered by the Heinze Electric Co., Lowell, Mass., and not the least of its interesting features is the low price at which it is sold—\$3.50. It is of the vibrator type, the diaphragm being set in motion by the action of an armature moved by electromagnets, designed especially for the Ford magneto current. The vibrator points are of tempered tool steel.

A peculiarity of the horn is that the diaphragm is of aluminum, which offers advantages in that it is light and permits extremely rapid vibration, and is proof against rust. The bell is of brass.

A convenient arrangement is the adjustment, by means of which the horn is regulated to give the best results with the particular magneto from which it derives its



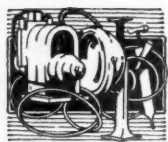
OAKES COMBINATION FAN, HORN AND PUMP

current. The adjustment operates on the vibrator and is controlled by a milled head at the rear of the casing inclosing the mechanism. By slightly turning this milled head one way or the other while the engine is running and the horn button is pressed, the tone can be regulated until it is at its best.

The outfit consists of the horn, button and flexible cord for carrying the current.

MICHIGAN GETTING GREEDY

Lansing, Mich., April 19—A new tax was proposed today by Senator Wood, whose bill provides for the doubling of the fees and does not exempt motor cars from local taxation. The license fee for motor cars thereby would be \$6, instead of \$3; chauffeur's licenses would be \$3, instead of \$2; manufacturers' licenses are to be charged \$20, instead of \$10 and for duplicate licenses the charge is to be \$3 instead of \$2. The bill is to replace the Smith measure, which provided for a state license tax according to weight and horsepower, but exempted motor cars from local taxation.



The Accessory Corner



FIG. 1—A NEW WORK COAT

It has pockets in the rear as well as in the front so that many tools may be carried around. Short or long sleeves may be had

Brad Kent Carbureter

AN unusual type of carbureter, which has the auxiliary air controlled by an automatic piston which covers and uncovers ports around the mixing chamber, is announced by the Frost Mfg. Co., Kenosha, Wis., under the name of the Brad Kent. This instrument has only two moving parts, the float and the air controlling piston. The piston as it rises to admit more auxiliary air also raises the needle valve and in this way the fuel supply is increased in proportion to the additional air admitted.

The auxiliary air ports, consist of eight square holes and form a belt around the mixing chamber. The venturi tube which enters at the bottom of the mixing cham-

ber passes up through the center to a point opposite the top edge of the ports. Within the mixing chamber and sliding over the venturi tube is a piston with square holes corresponding in size to the auxiliary air ports. Anchored at the top of the piston is a needle valve. The piston at slow speed remains at the bottom of its stroke with the secondary air ports closed as shown in Fig. 2. The primary air supply enters through ports at the bottom of the venturi tube and comes in contact with the fuel at the neck of the venturi tube where it reaches its highest velocity. As the throttle is opened and the suction in the mixing chamber increases, atmospheric pressure entering through a ball check valve, B, in the bottom of the mixing chamber raises the piston and admits more air through the secondary air ports, at the same time increasing the fuel supply by drawing the taper



FIG. 3—BRAD-KENT CARBURETER

Exterior appearance with hot air stove fitted. The needle adjustment is by the hand wheel at the bottom

needle farther out of the nozzle. Adjustment is made by raising or lowering the needle valve by means of a hand wheel at the bottom of the carbureter.

Price of the 1 inch is \$10 and 1 1/4 inch, \$12.50 A special Ford outfit is made which sells for \$12.50.

Never-Rip Work Coat

The Beaver Dam Overall Mfg. Co., Beaver Dam, Wis., is marketing a work coat and motor car cover, both of which will be of interest to the car owner and the garageman. The coat shown in Fig. 1 is one especially designed for work around a motor car and is fitted with pockets in the rear as well as in the front allowing of a great number of tools being

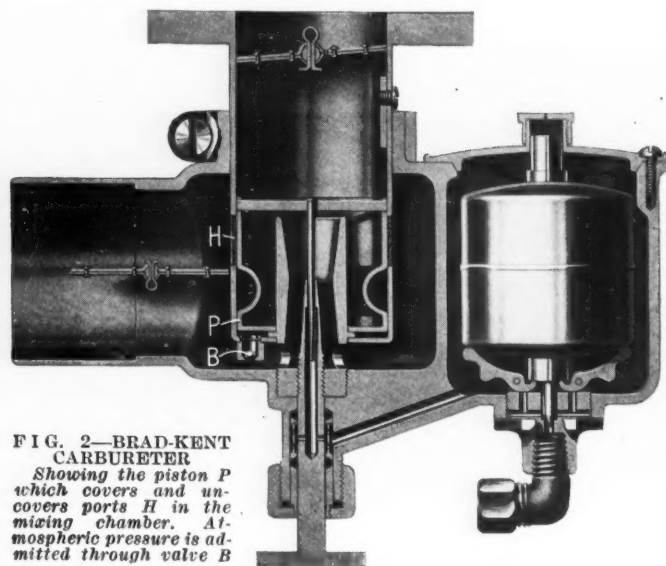


FIG. 2—BRAD-KENT CARBURETER
Showing the piston P which covers and uncovers ports H in the mixing chamber. Atmospheric pressure is admitted through valve B

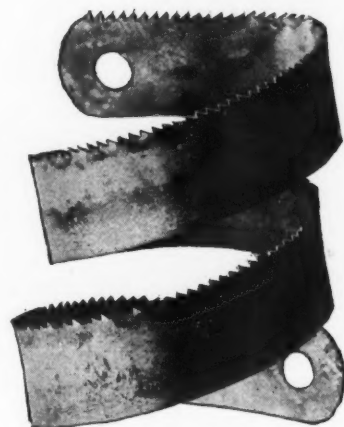


FIG. 4—ATKINS SAW BLADE

This shows how the blade may be coiled up without causing it to break

carried with little inconvenience. The sleeves are either short or long as desired by the purchaser and the price is \$1.25.

The motor car cover, shown in Fig. 7, is of white cloth designed to cover every part of the car but the wheels and should find excellent application when the car is being stored for the winter or garaged for any length of time. Covers are made in two sizes, selling at \$5 and \$8.

Atkins Saw Blade

A saw blade which is claimed to be non-breakable and which can be handled like spring steel and coiled up as shown in Fig. 4 is announced by E. C. Atkins & Co., Indianapolis, Ind. It is claimed that it may be bent a number of times and then used for as long a period as the regular hard type.

Goodrich Tire Caliper

An instrument for gauging the degree of inflation of a tire is the special caliper manufactured by the B. F. Goodrich Co., Akron, O. The operation of the caliper is based on the fact that the amount of bulge in the side walls of a tire, at the point where the tire rests on the ground, bears a definite relation to the diameter of the tire at the top where there is no weight to cause bulging.

The caliper, which is of nicked steel, consists of a bar with a leg projecting at right angles at one end of it and a second leg, parallel with the first, sliding on the bar. On the bar are two scales, one above the other; the scales are marked with letters. The lower scale begins at a point further from the stationary leg than the upper scale. As shown in Fig. 5, A on the upper scale is nearer the stationary leg than A on the lower scale. The difference between the two A's is the proper difference between the diameter of the tire at the top and the bottom.

To use the caliper it first is adjusted to

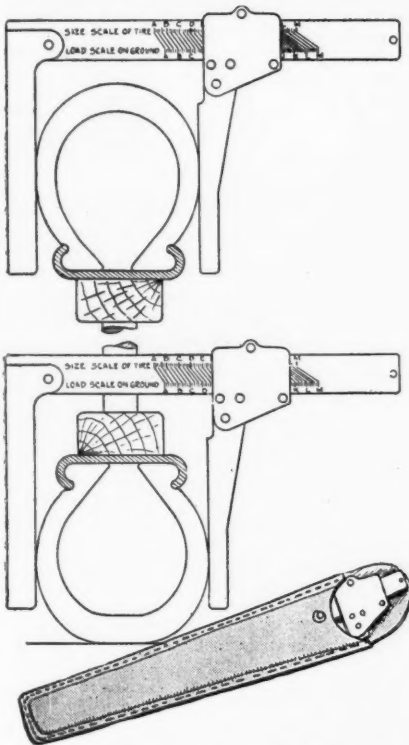


FIG. 5—GOODRICH TIRE CALIPER

This instrument tells the proper or improper inflation and acts in the capacity of a pressure gauge

the tire at the top, the sliding leg being moved until the tire just fits between the legs. The mark of the top scale is then noted and the sliding leg moved until it stands at the corresponding mark on the lower scale. The caliper is straddled over the tire and rim at the bottom, where the tire is bulged from the weight of the car. If the bulge is just sufficient to fit snugly between the caliper legs the inflation is perfect. If the caliper is loose on the tire the tire is too hard and air should be let out until the space is filled, while if the bulge is so great that the caliper will not go down, air should be pumped in until the proper diameter is produced. The device is intended for use with any make and type of pneumatic tire. Both legs fold on the main bar and the whole tool goes into a leather case 10½ inches long. The price is \$1.

See-Right Door Lock

The Searight Mfg. Co., Detroit, has come forward with an improvement in door latches for motor cars, which it is claimed is positive in action, due to its principles of construction. The See-Rite door latch is what is known as a "dead lock" and is operated with a lifter, instead of a knob or handle. When the door is open, all parts of the lock are flush with the door. This has the advantage that nothing protrudes to catch or tear the clothing or injure the hands.

To open the door from the outside, all that is necessary is to grasp the door with either hand, allowing two fingers to drop beneath the lifter and a ½-inch upward motion withdraws the bolt. From the in-

side, the thumb naturally drops beneath the lifter.

This lock consists of but four working parts and two helical springs—one to operate the bolt, the other set under the back end of the trip plate to give the forward end a pressure toward the bolt. The trip plate, which lays over the bolt on the inner side of the lock, is hinged toward the back part and has a detention pin set in the forward end in line with a hole in the bolt. When it is desired to open the door, the lifter is raised, withdrawing the bolt from the strike plate. The first ¼-inch motion of the door in opening allows the detention pin to drop into the hole in the bolt, holding it within the lock while the door is in an open position. A finger on the trip plate extends below the bolt and has a pin extending through the case about ¼ inch when the door is open. In closing the door, the last ¼ inch brings



FIG. 6—OLYMPIC HORN

This is the vibrator which sells for \$2.50. A motor-driven type also is furnished

this pin against the strike plate, pushes it within the lock and forces the detention pin out of the bolt, allowing it to shoot into the strike plate. It is shown in Fig. 8.

Olympic Horns

The Electric Spark Appliance Co., 140 Imlay street, Brooklyn, N. Y., is marketing two types of electric horns, one of the motor-driven type called model C, and the other a vibrator type styled model B. The latter is shown in Fig. — and is made in two types for under-the-hood mounting and outside-the-dash attachment. The first named lists at \$2.50 and the latter at \$3. The motor-driven horn also is made in these styles and sells for \$5 and \$6 according to the mounting desired.

Carbon-Not Carbon Remover

A chemical compound which is designed for injection into cylinders fouled by carbon deposits, and which, according to the maker, will not injure the metal, is sold by the Carbon-Not Sales Co., 1789 Broadway, New York. The compound is in the form of a liquid and is applied by means of a spray bulb, which is supplied for 25 cents. It is injected through the spark plug hole or through a valve cap port while the engine is warm, allowed to stand for from 15 minutes to 3 hours, according to the amount of carbon to be removed, and the loosened carbon is blown out through the exhaust when the engine is started.

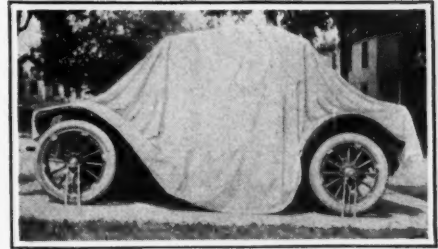


FIG. 7—NEVER-RIP CAR COVER

Can be used for winter storing of cars in covering them as shown above

It is said not to interfere with lubrication or cause volumes of smoke after starting the motor. The rubber injecting bulb holds just enough for one cylinder and has a curved spout which enables every part to be reached with the spray.

Price, pints, \$1.25; quarts, \$2.25; gallons, \$7.50.

New Car-Extracting Device

The Car Puller Co., Ladysmith, Wis., is marketing a new device for extricating motor cars from dangerous positions under their own power. The device is styled the self-anchoring puller, weighs 20 pounds and sells for \$10 complete. It packs into a kit 25 inches long and will fit under an ordinary seat.

Opco Not a Chemical

The American Oil Products Co., Buffalo, N. Y., calls attention to the fact that Opco carbon remover is made of pure, harmless oils and is not a chemical carbon remover, in the strict sense of the word, as suggested in the description of this in Motor Age, issue of March 13. The word was used to distinguish the product from the mechanical and oxygen types.

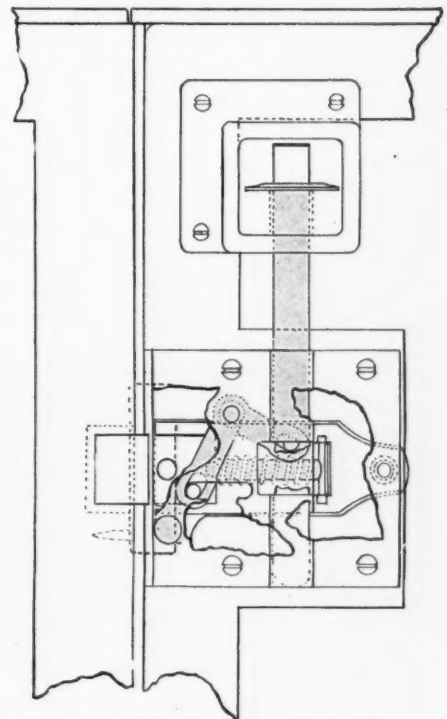
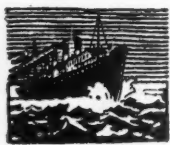


FIG. 8—SEE-RIGHT DOOR LOCK

This lock is operated with a lifter instead of a knob and when the door is closed every part of the lock is flush with it



From the Four Winds



WILL Publish Jitney Bus Paper—C. R. Hamilton, president of the Dallas Jitney Association, has organized a company and will publish a weekly paper in the interests of the jitney business. There are now more than 500 jitneys in operation in Dallas, Tex.

New Mexico Registers 3,023 Cars—As a reflection of the prosperity which the people of New Mexico are now enjoying, it may be noted that the number of motor car licenses issued up to March 26 of 1915 was 3,023, as compared with 1,969 issued up to the same time last year.

Allies Buy 4,352 American Trucks—The American motor truck has been most popular with the allies. A total of 4,352 commercial vehicles have been purchased by England, France and Russia in Europe and Asia in the 7 months ending February 28. The value is placed at \$12,365,943, an average of \$2,841 for each truck. The greatest number of these trucks were sold to France, 2,277, valued at \$6,317,150, being exported in the first 7 months of the war. England is second with 1,559, valued at \$4,030,261. Russia, in Europe, bought 305, valued at \$1,280,187, and Russia, in Asia, 211, valued at \$738,345.

Motor Noises Annoy Quakers—Superintendent of Police Robinson has issued orders to the Philadelphia police to the effect that hereafter unnecessarily loud or constant blowing of horns or the opening of cut-outs late at night or in the early hours of the morning must cease. Motorists offending in this respect will have their license number jotted down, sent to the city hall and a summons will be issued for the drivers. Residents of hotels and apartments have sent numerous complaints to police headquarters that night owl motorists make unnecessary sleep-disturbing noises, with the above result.

Five Thousand Men on Roads—Close to 5,000 men are at work on the Pennsylvania state highways, maintenance work having been started last week under the direction of Acting Highway Commissioner Joseph W. Hunter. George H. Biles, maintenance engineer, expects to have nearly 10,000 men at work soon. Governor Brumbaugh has worked out a plan for financing the road improvements of the state, and bills will be presented that are expected to furnish the funds. By these measures something like \$5,000,000 should be raised for maintenance, while the Jones bill for a 4-mill tax on all bonds at their source is expected to yield \$1,250,000 for state and dirt roads.

Plans Bus Line Over Mountains—Plans for an elaborate motor stage service for summer travel over the foothills from Golden, Colo., to Idaho Springs are being made by William Williams, of Golden, who has made a fortune in the cement business and won considerable fame as a builder of mountain roads. Mr. Williams purchased his second Stanley steamer for this line last week, and says he expects to have ten or twelve cars in operation by the middle of June. He has had one car running since October and has not missed one of his daily trips, although at times there have been long stretches of snow, 2 feet or more in depth. The road is 25 miles long and one of the most picturesque to be found anywhere, affording views varying from the broad expanse of level plains through eastern Colorado toward Nebraska and Kansas to the rugged canyons along the road and the snowy peaks of the main range only a few miles beyond Idaho Springs. It

includes several miles of new mountain boulevard winding up the face of Lookout mountain in one of the most attractive drives in the Rockies.

Municipal Cars for Charity Work—Mayor Karb, of Columbus, O., has announced a plan to give the aged and infirm people of Columbus an outing on Sundays during the summer season by using the municipal motor cars. An effort will be made to secure the most worthy and needy for the outings.

Chauffeurs to Report on Roads—Instead of depending on the police of the various districts to report on highway conditions, as has been customary, Chief Connell, of the bureau of highways, has charged the chauffeurs in the various municipal departments with the duty of reporting on the condition of the streets and roads in and around the city. It is argued that the chauffeurs engaged in the employ of the city are better qualified to give first-hand information on broken pavements and other defects in thoroughfares, inasmuch as they daily traverse

miles of roadway and are strong advocates of good roads. A memorandum of the reports will be kept and tabulated, defects remedied as they occur, and thus the number of motor car accidents, insofar as they are attributable to sunken manholes, holes in the paving and the like, will be appreciably reduced.

Take One Drink, Lose License—A single drink of liquor taken by operators of motor cars in Maryland will result in licenses being forfeited immediately, provided State Motor Vehicle Commissioner H. A. Roe is convinced that the licensee has been guilty of consuming intoxicants while at the wheel of a car. This edict has been issued by Commissioner Roe and he has spread it broadcast in a crusade that his department is waging against reckless driving.

Stealing Car Felony in Texas—The Texas legislators have passed a law making the theft of a motor car for joy riding a felony. Heretofore this violation has been a misdemeanor through the injection of the word "steal" into the bill. Since the passage of the new law the theft of cars by joy riders has decreased in Dallas and vicinity more than fifty percent. Two years in the state penitentiary is now the lightest penalty for such violations.

Constructing Motorway in Texas—More than 28 miles of the Dallas and Southwestern motorway has been completed. This road will run from Dallas to Glen Rose, 75 miles, and to Fort Worth, 50 miles. It will be the longest motorway in the south, and is being constructed at a cost of \$2,000 per mile. The company building it has been assured protection in every way and has been organized under the laws of Texas. Glen Rose is a health resort and off the railroad. The motorway will be open to all motorists, a toll charge being made for the users of the road.

Pueblo Passes Jitney Ordinance—An ordinance permitting the operation of jitney bus lines in a restricted way has just been passed by the city council of Pueblo, the only Colorado city thus far granting any jitney permits. The ordinance requires a license fee of \$50, a bond of \$10,000, and the filing of a draft showing the exact route to be traveled by all cars to which permits are issued. It provides further that the cars shall be allowed to stop only at alleys, that all drivers must be at least 21 years of age, and that no car shall be allowed to carry more passengers than there are seats.

Detroit Wants Municipal Garage—At a recent meeting of the Detroit Automobile Dealers' Association, a committee was appointed to confer with the city authorities concerning the proposed municipal garage. The project originated about 2 years ago and was suggested by the commissioner of parks and boulevards. It was his opinion that with the rapid development of the motor car business in Detroit and the traffic congestion in the business district which was quite pronounced at that time, something would have to be done eventually to relieve this situation. He did not favor a surface garage because in order to have one which could house several thousand cars an immense building would have to be erected at a great expense. Furthermore, there is no available place for such a structure near the center of the city. Therefore the only way to relieve the situation would be a garage under Cadillac square which would be large enough to park several thousand cars.

Coming Motor Events

CONTESTS

- *April 22—Road race, Oklahoma City, Okla.
- May 1—Track meet, Irvington, N. J.
- May 1-2—Track meet, Portland, Ore.
- May 8—Track meet, Salem, Ore.
- May 9—Track meet, St. Louis, Mo.
- May 15—Track meet, Singac, N. J.
- May 15-16—Track meet, Columbus, O.
- May 15-16—Track meet, Centralia-Chehalis, Wash.
- May 22-23—Track meet, Cleveland, O.
- May 23—Track meet, Seattle, Wash.
- *May 29—500-mile speedway race, Indianapolis, Ind.
- May 29-30—Track meet, Seattle, Wash.
- May 31—Track meet, Irvington, N. J.
- June 5—Track meet, Pittsburgh, Pa.
- June 5-6—Track meet, North Yakima, Wash.
- June 9—100-mile dirt track race, Galesburg, Ill.
- June 12—Track meet, Brighton Beach, N. Y.
- June 17—Track meet, Boston, Mass.
- June 19—Track meet, Hartford, Conn.
- *June 19—500-mile speedway race, Chicago.
- *July 3—300-mile race, Sioux City, Ia.
- July 4—Track meet, Oshkosh, Wis.
- *July 4-5—Speedway races, Tacoma, Wash.
- July 4—Road race, Visalla, Cal.
- July 4—Road race, Chico, Cal.
- *July 5—Speedway races, Omaha, Neb.
- July 9—100-mile dirt track race, Burlington, Ia.
- July 31—Road race, Denver, Colo.
- August 14—Dirt track races, Janesville, Wis.
- August 20-21—Elgin road races, Elgin, Ill.
- August 28—100-mile dirt track race, Kalamazoo, Wis.
- September 6—Speedway races, Detroit, Mich.
- September 6—Speedway races, Providence, R. I.
- September 24-25—Track meet, Grand Rapids, Mich.
- October 1-2—Track meet, Trenton, N. J.

* Sanctioned by A. A. A.

SHOWS AND CONVENTIONS

- May 17-18—Annual meeting of American Automobile Association, Boston, Mass.
- June 14-17—Summer meeting of Society of Automobile Engineers, Detroit and Great Lakes cruise.
- September 13-19—Pan-American road congress, Oakland, Cal.
- January 1-8—New York show.
- January 22-29—Chicago show.



Among the Makers and Dealers



MADE Commercial Manager for Weidely—D. G. Ong has been appointed commercial manager of the Weidely Motor Co., Indianapolis, Ind.

Buys Sheppard Mfg. Co.—A. Willington has purchased the Sheppard Mfg. Co., Chicago, maker of radiators, fenders, hoods and tanks, from Ida M. Sheppard, who has assumed all the liabilities of the company.

New Packard Shipping Record—On April 12, the Packard established a new record by shipping the largest number of motor vehicles turned out in any 1 day since the company started in business. The day's output, when loaded aboard freight cars, represented a value of \$212,795.

Accepts Savage Tire Position—L. J. Cuniff, of the advertising department of the M. Rumely Co., Laporte, Ind., will leave May 1 to become advertising manager of the Savage Tire Co., San Diego, Cal., and the California representative of the H. J. McGann advertising agency, New York.

Addition to Packard Plant—The Packard Motor Car Co. will build a three-story addition to its plant on Concord avenue. The structure will be 52 by 113 feet in size and of reinforced concrete. It will cost about \$10,000 and will be used by the heat treating department.

Capital Stock Is Increased—The J. W. Murray Mfg. Co., Detroit, which makes motor car specialties, has declared a dividend of 100 per cent and increased its capital stock from \$60,000 to \$200,000. Recently a one-story brick addition, 40 by 168 feet, was completed, and now a further increase in the size of the plant is contemplated.

Dividend for Lozier Creditors—A 10 per cent dividend is being sent by the Detroit Trust Co., receiver, to the creditors of the Old Lozier Motor Co. The amount involved is about \$150,000 and represents about half of the approved claims. The creditors of the bankrupt American Voiturette Co. are receiving a second dividend of 10 per cent, representing an outlay of about \$30,000.

Declares 200 Per Cent Dividend—A dividend of 200 per cent to the stockholders of the Michigan Steel Castings Co., Detroit, has been authorized by the directors. It represents a part of the earnings of the concern since it was founded, 8 years ago, and during which time the profits were not distributed in order to build up the business. The capital stock now will be increased from \$90,000 to \$210,000.

Making New Type of Spring—The Harvey Spring and Forging Co., Racine, Wis., a manufacturer of motor car springs and forgings, has started a large production of a new type of bolster spring for heavy duty vehicles which is the outgrowth of experimentation in its motor car spring business. The spring is being made in a simple form for application to vehicles already in use without reconstruction.

Old Decision Is Upheld—Referee in Bankruptcy Lee E. Joslyn, who disallowed a claim of \$57,107.02 brought by the Blomstrom Mfg. Co., against the Lion Motor Co., in 1909, has been upheld in his decision by Judge Arthur J. Tuttle, of the United States district court, Detroit. Both of these motor car companies have been bankrupt for some time and it was when the Blomstrom concern went into bankruptcy that the claim was filed against the Lion company for property received from the Blomstrom company. The referee in bankruptcy held that the contract was only

an assumed one and that it had never been actually entered upon in a proper legal manner, and therefore did not allow the claim.

Chicago Branch for Chase Truck—The Chase Motor Truck Co., Syracuse, N. Y., will open a Chicago branch soon in charge of R. M. Fisher.

Paige Increases Monthly Dividends—The Paige-Detroit Motor Car Co. has increased its monthly dividend from 4 to 7 per cent, which is at the rate of 84 per cent annually. The capital stock of the company is \$250,000 and it is stated that there are only eighteen stockholders. The company's net earnings are reported to be between \$500,000 and \$700,000 annually. The par value of the stock is \$100 and the most recent sale of stock was said to have been at \$325 a share.

Miller Heads Wheel Company—W. M. Swift Miller, for many years associated with the Allis-Chalmers, Westinghouse and Industrial Controller companies as publicity, advertising and sales manager, has purchased an interest in the T. S. Wheel and Mfg. Co., Milwaukee, which recently began to market a new type of all-steel resilient wheel for motor cars and trucks after several years of experimentation and perfection. Mr. Miller

has been elected president and general manager of the company. The present capacity of the plant is 2,000 wheels monthly, but orders are coming in at such a rate that extensions will soon be required.

Shock Absorber Maker Moves—Forced to obtain larger quarters, the John W. Blackledge Mfg. Co., maker of the Velvet shock absorber, has moved from 2110 Michigan avenue to 341-49 East Ohio street, Chicago.

S. G. V. Plant Closed Down—The S. G. V. Co., Reading, Pa., with offices and factory at 302 North Eighth street, has suspended operations indefinitely, according to a statement given out at the offices of the company. It is said that the firm and plant is being reorganized.

Waukesha Motor Co. Expanding—The Waukesha Motor Co., Waukesha, Wis., has started work on adding twenty-four units to its plant to supplement four units recently added. The plant has been operating 24 hours a day for some weeks past and is obliged to maintain a record production indefinitely because of the unusual demand for Waukesha motors from motor car and truck builders, notably the Sternberg Motor Truck Co., Milwaukee, which is busy on large war orders.

Brooklyn, N. Y.—Standard Motor Co., of Brooklyn; capital stock, \$10,000; incorporators, A. P. Willandum and L. M. Smyth.

Brooklyn, N. Y.—Standard Motor Service Co.; capital stock, \$10,000; incorporators, A. P. Leibenger, Otto Amend and H. M. Landgraf.

Buffalo, N. Y.—National Limousine Top Corp., to deal in motor car tops, etc.; capital stock, \$25,000; incorporators, Edw. L. Kunz, W. Lowell Grove and Fred Dobmeier.

Buffalo, N. Y.—Universal Carburetor Co., to deal in carburetors, motors, cars, etc.; capital stock, \$75,000; incorporators, M. J. Harlowe, E. J. Stratton and H. Treglow.

Chicago, Ill.—Millimeter Co., to manufacture motor driven vehicles; capital stock, \$100,000; incorporators, O. E. Joseph, A. K. Joseph and James Callahan.

Cincinnati, O.—Northway Auto-Parts and Sales Co., to deal in motor cars and accessories; capital stock, \$5,000; incorporators, F. E. MacFarland, Thomas W. Allen, R. E. Northway, Elizabeth Northway and Hudson K. Young.

Cleveland, O.—Hallock Eng. Co., to manufacture motor cars and accessories; capital stock, \$25,000; incorporators, Thomas P. Hallock, R. H. Bosely, R. E. Kimmell, William H. Chapman and Olga E. Schultz.

Cleveland, O.—C. F. Hanger Co., to deal in motor cars and supplies; capital stock, \$30,000; incorporators, C. F. Hanger, G. L. Dippel, Roscoe M. Ewing, R. J. Hanger and R. E. McKisson.

Cleveland, O.—Movo Motor Truck Co.; capital stock, \$10,000; incorporators, W. O. Harmon and others.

Columbus, O.—General Service and Specialty Co., to deal in motor cars and accessories; incorporators, Jackson C. Gilmore, Wm. S. Gilmore, Louis McGuire, Sherman B. Randall and Karl K. Burr.

Columbus, O.—G. M. Service & Specialty Co., to handle motor cars and accessories; capital stock, \$5,000; incorporators, Jackson G. Gilmore, William S. Gilmore, Louis McGuire, Sherman B. Randall and Karl E. Burr.

Dover, Del.—Self Sealing Inner-tube Co., to manufacture, sell and deal in and with motor car tires and tubing; incorporators, Carl Vandervoort, L. C. Rowland, F. M. Casey.

Grand Rapids, Mich.—Mechano-Gear Shift Co.; capital stock, \$10,000; incorporators, Albert Dickinson, B. E. Richardson and Espey Stanton.

Guelph, Ont.—Guelph Tire & Rubber Co., Ltd.; capital stock, \$350,000; incorporators, A. H. Davidson, T. N. Dunn and A. Orr.

Hopkinsville, Ky.—Hopkinsville Auto Transit Co.; capital stock, \$10,000; incorporators, J. D. Thompson, W. R. Wheeler and Raymond Skeritt.

Joliet, Ill.—New Era Eng. Co., to manufacture and sell motor cars and accessories; capital stock, \$30,000; incorporators, M. M. Case, L. S. Golding and O. Blase.

Louisville, Ky.—Colhoun Automobile Co.; capital stock, \$1,000; incorporators, W. G. Houghland, Mrs. McGhee Houghland and Homer Puyeur.

Madison, Wis.—Wisconsin State Good Roads Assn., to co-operate for better roads in Wisconsin; incorporators, Malcolm MacKinnon, F. W. Karsten and A. G. Menges.

New Haven, Conn.—New Haven Motor Coach Co.; capital stock, \$5,000; incorporators, John R. Zygalinski, Eugene J. Ahearn and Mary Zygalinski.

Recent Incorporations

Akron, O.—Ceylon Tire Co., to deal in motor car tires and accessories; capital stock, \$10,000; incorporators, H. W. Holcomb, F. R. Purviance, X. C. C. Steffern, C. A. Cheney and W. F. Kelley.

Albany, N. Y.—Bender Robinson Co., to paint motor cars; capital stock, \$25,000; incorporators, John Bender, J. Henry Robinson, James Forsberg.

Albany, N. Y.—Cornfield Resilient Wheel Co., to deal in motor car and truck tires; capital stock, \$400,000; incorporators, Stanislas Verusio, William H. Byrne, Frank Cornfield, and O. C. Hirsch.

Albany, N. Y.—DuBois Machine Shop, motor car repair shop; capital stock, \$25,000; incorporators, Geo. C. DuBois, Edw. J. DuBois and Benj. Carson.

Albany, N. Y.—Famous Tire and Rubber Co.; capital stock, \$15,000; incorporators, Emanuel Newman, William R. Jackson and William R. A. Ihne.

Albany, N. Y.—Gotham, Inc., to deal in and repair motors, motor cars, machinery, etc.; capital stock, \$50,000; incorporators, M. Roberts, E. J. Shutt, G. Y. Webster.

Albany, N. Y.—National Limousine Top Corp., to deal in motor cars, etc.; capital stock, \$25,000; incorporators, Fred Dobmeier, W. Lowell Grove and Edward L. Kunz.

Albany, N. Y.—Pultman Supply Stores Corp., to construct motor cars; capital stock, \$25,000; incorporators, Francis B. Wood, William J. Murray, Thomas C. O'Connor, F. B. Wood.

Albany, N. Y.—Railway Specialties Corp., to manufacture motor car appliances; capital stock, \$1,500; incorporators, John W. Hamilton, Henry Roth and Burke & Mitchell.

Albany, N. Y.—J. B. Salmon & Co., to deal in motor cars, supplies, etc.; capital stock, \$10,000; incorporators, Arnaw Garbelein, Fay P. Stanton, Helen A. McCordle and W. C. Allen.

Austin, Tex.—El Paso Auto Supply Co.; capital stock, \$10,000; incorporators, A. W. Bittick, E. A. Pumphrey and C. W. Slobke.

Bangor, Me.—Miller Transmission Co., motor car supplies; capital stock, \$25,000.

Beloit, Wis.—R. & L. Instrument Co., to manufacture motor car signal devices; incorporators, James E. Keeley, John L. Floyd, Leonard S. Carr and Horace D. Ball.

Boston, Mass.—C. A. Jackson Automobile & Motor Truck Co.; capital stock, \$50,000; incorporators, C. H. Dow, Chas. A. Jackson and James N. Miller.

Bridgeport, Conn.—Trumbull Motor Car Co., to deal in motor cars, tools, etc.; capital stock, \$300,000; representative, Elbert B. Hamlin.

Brooklyn, N. Y.—Manroet Motor Co.; capital stock, \$100,000; incorporators, Henry Manroet, Adolf W. Behrens and Jacob Schefer.



Brief Business Announcements



EVART, Mich.—W. R. Campbell has sold his garage to E. S. Gough.

Flint, Mich.—M. E. Donnelly has opened a garage and taxi service at Sixth avenue and Chippewa street.

Ozark, Ala.—A wholesale and retail accessory business has been started here by the Simmons Supply Co.

Baltimore, Md.—The Cut-Rate Tire Co. has changed its name to the McGraw Tire Co. J. E. McGraw is at the head of the concern.

Milwaukee, Wis.—Otto M. Tverdahl has been appointed manager of the Milwaukee branch of the Winton Motor Car Co., Cleveland, O., to succeed John I. Miller, who has been in charge since the establishment of

a factory branch. The branch is now located at 503-507 Broadway.

Nashville, Mich.—A. B. Winans has opened a new garage and repair shop.

Belding, Mich.—Ames & Unger has opened a garage and machine shop.

Fenton, Mich.—S. B. Campbell and Karl Steen have opened a garage and machine shop in the Coe Mfg. Co. building.

Baltimore, Md.—F. Morrison Boyd, formerly connected with the Lambert Automobile Co., has been made sales manager of the Knight Tire Co.

Tacoma, Wash.—The latest concern added to Tacoma's motor row is the Standard Motor Car Co., headed by W. L. Kirby. This concern will handle the Trumbull car, and is also looking for another car in the \$800 to

\$1,000 class to handle in Tacoma and Pierce county.

Detroit, Mich.—The Detroit branch office of the Warner Gear Co., of Muncie, Ind., has been moved from the Ford building to 967 Woodward avenue.

Chetek, Wis.—F. A. Richards, agent for the Ford, Paige and Buick here, has established a garage and service station and will carry a complete stock of accessories and supplies.

Jersey City, N. J.—S. P. Woodard, for many years connected with the motor car industry, has been appointed general sales manager of the tire and tube department of the New Jersey Car Spring and Rubber Co., of this city. For the past 8 years this concern, which was established in 1858, has

Recent Agencies Appointed by Motor Car Manufacturers

PASSENGER CARS

Town	Agent	Make	Town	Agent	Make
Albuquerque, N. M.	F. E. Dearth	Metz	Greeley, Colo.	Dr. R. C. Westcott	R. C. H.
Avon, Colo.	G. C. Nottingham	Apperson	Columbus, O.	Herald Auto Co.	Kissel
Asbury Park, N. J.	John Thomson	Studebaker	Cincinnati, O.	C. A. Murphy	Dort
Albany, N. Y.	Baldwin Bros.	Moon	Chatfield, Minn.	W. E. Watterworth	Oldsmobile
Avon, N. Y.	H. E. Longfellow	Kissel	Caseville, Mich.	Straight & Son	Oldsmobile
Albany, Minn.	G. Hodel	Oldsmobile	Chillicothe, O.	Quinby Climer	Oldsmobile
Adrian, Mich.	City Garage	International	Cleveland, O.	Seidner-Merritt Co.	King
Alliance, O.	Kendall & Kayer	Reo	Cleveland, O.	Seidner & Merritt	King
Alliance, O.	McCafferty and Stermer Garage	Chevrolet	Calgary, Alta.	Diamond Motor Co.	King
Alliance, O.	Edward Witherspoon	Paige	Columbus, O.	Brasher Motor Car Co.	Dort
Alliance, O.	Alliance Motor Car Co.	Overland	Chicago Heights, Ill.	Lincoln Highway Garage	Dort
Altoona, Pa.	R. F. Ball	King	Caledonia, Minn.	Clifford Bros.	Dort
Akron, O.	Cook Bros.	Dort	Clara City, Minn.	Clara City Merc. Co.	Dort
Albert Lea, Minn.	H. & H. Auto Co.	Dort	Charlevoix, Mich.	Benjamin Brown	Ford
Adrian, Minn.	P. Landee	Dort	Canton, S. D.	Sundroid & Kolsrud	Studebaker
Basin, Wyo.	G. R. Hoover & Co.	Cartercar	Crookston, Minn.	D. A. Vannet	Dort
Ambrose, N. D.	Otto Terbett	Dort	Columbus, N. D.	G. J. Coughlin	Dort
Brookings, S. D.	F. C. Fryer	Studebaker	Cathay, N. D.	Wm. Snuse	Dort
Atwater, Minn.	Walter McRoe	Dort	Carver, Minn.	C. E. Danwalter	Dort
Boston, Mass.	F. E. Wing	Waverley	Dubuque, Ia.	Byrne Brothers	Franklin
Basin, Wyo.	G. R. Hoover & Co.	Metz	Dayton, O.	W. C. Wampler & Co.	King
Hannibal, Mo.	E. C. Long Mfg. Co.	Franklin	Dallas, Tex.	R. L. Cameron Auto Co.	King
Bryon, Ill.	Leslie D. Marshall	Oldsmobile	Dayton, O.	Miami Motor Co.	Kissel
Bristol, Va.	Bristol Hdw. Corp.	Oldsmobile	Delavan, Wis.	Homer Jones	Studebaker
Brodhead, Wis.	Eggen & Bertness	Buick	Elk River, Minn.	E. N. Daly	Dort
Battle Creek, Mich.	W. R. Taylor	Chevrolet	El Paso, Tex.	Pioneer Motor Co.	King
Buffalo, Minn.	Ahlm & Franke	Dort	East Troy, Wis.	Krueger & Peterson	Dodge
Bottineau, N. D.	H. O. Sheldon	Dort	Fairview, Mont.	R. D. Stewart	Dort
Butler, Pa.	Fred T. Iman	Dort	Forreston, Minn.	J. A. Lynch	Dort
Brodhead, Wis.	Eggen & Bertness	Dodge	Farmington, Minn.	G. W. Hoffman	Dort
Brodhead, Wis.	Eggen & Bertness	Moon	Foxhome, Minn.	Steney & Newshwander	Dort
Beldenville, Wis.	W. A. Foss	Dort	Freemont, Nebr.	Koyn Auto Co.	Moon
Barron, Wis.	Earnest Nelson	Dort	Fredericktown, O.	Harriss & Hassell	Dort
Belvidere, Ill.	D. P. Greenlee	Kissel	Fond du Lac, Wis.	Fond du Lac Auto Co.	Cadillac
Blue Earth, Minn.	Greiman & Hornke	Dort	Fond du Lac, Wis.	Fond du Lac Auto Co.	Buick
Belgrade, Minn.	N. P. Bracker	Dort	Galveston, Tex.	Taylor Motors Co.	King
Benson, Minn.	J. A. Olson	Dort	Grand Rapids, Mich.	Phelps Auto Sales Co.	Apperson
Beloit, Wis.	J. F. McKearn	Dort	Grand Rapids, Mich.	Crow Motor Car Agency	Crow
Battle Creek, Mich.	Jackson Auto Co.	Dort	Grand Rapids, Wis.	John E. Daly	Regal
Browerville, Minn.	Breuer Bros.	Dort	Grand Rapids, Mich.	Smith-Allen Co.	Hollier
Bowlus, Minn.	Vincent Klisch	Dort	Gaylord, Mich.	Chalker & Murray	Ford
Brainerd, Minn.	Rosko Bros.	Dort	Grafton, Wis.	Clausing & Kranz	Oldsmobile
Brentford, S. D.	Fred B. Mann	Dort	Grand Rapids, Mich.	Reid Auto Co.	Dort
Baldwin, Wis.	F. B. Cave	Dort	Gunnison, Utah	J. W. Edwards	Oldsmobile
Harrisburg, Ill.	W. Dumont Garage	Moon	Glenville, Pa.	W. S. Hildebrand	Dort
Birmingham, Ala.	E. L. Lenhart	Moon	Grand Rapids, Mich.	Western Michigan Motor Co.	Mitchell
Brookston, Ind.	M. E. Bennett	Studebaker	Galesville, Wis.	Carl McKeith	Dort
Benkelman, Nebr.	J. F. Richardson	Studebaker	Hoffman, Minn.	Theo. Levin	Dort
Berlin, Nebr.	City Garage Co.	Studebaker	Hudson, Wis.	Gust Jacobson	Dort
Clio, Mich.	R. R. Knight	Studebaker	Hastings, Nebr.	Stephen Schultz	Koehler
Caldonia, Mo.	W. J. Dent	Moon	Hicksville, N. Y.	Abrams & Minch	Studebaker
Comfrey, Minn.	Frank Schwerzler	Dort	Hollywood, Cal.	Hollywood Mission Garage	Pullman
Chetek, Wis.	F. A. Richards	Paige	Hamilton, O.	West Side Motor Co.	Kissel
Chippewa Falls, Wis.	C. E. Johnston	Kissel	Hull, Ia.	Spencer Investment Co.	Kissel
Chetek, Wis.	F. A. Richards	Ford	Harrisburg, Pa.	Ensminger Motor Co.	Franklin
Chetek, Wis.	F. A. Richards	Buick	Hayfield, Minn.	A. A. Aaby	Dort
Columbus, O.	Dr. R. C. Westcott	Regal	Henning, Minn.	Geo. A. Paulson	Dort

manufactured and sold car springs, tires and tubes.

Peashtigo, Wis.—Eugene St. Peter has reopened his garage, which has been closed since last November.

Diamondale, Mich.—D. J. Miller has purchased the old Creamery building and will start into the garage and motor car repairing business, making a specialty of Ford cars.

Kenosha, Wis.—V. Lee Alward has retired as secretary and treasurer of the Vincent-Alward Co., and resumed his connection with the sales department of the Simmons Mfg. Co., Kenosha, springs and bedsteads. W. W. Vincent becomes sole owner, but the firm name and policies will be continued as before.

Omaha, Neb.—The Omaha Speedometer Service Station has opened for business at 2044 Farnam street, with a complete line of Stewart-Warner accessories.

Canton, O.—The Canton Motor Car Co., the Canton Buggy Co., Monnot & Sacher and the Walnut Garage, all of Canton, are

instrumental in the incorporation of the Canton Oil and Grease Co., which plans to erect a building for the manufacture of motor car oils and greases. A. H. Wilson is general manager.

Platteville, Wis.—W. F. Schroeder has purchased the Condry warehouse property, and is remodeling it into a garage and repair shop of the most modern fireproof construction.

Baltimore, Md.—The Tire Shop is the successor to Eldred B. Quarles & Co., Charles and Twentieth streets. Those interested in the new concern are William C. Floyd and Herbert W. Rydstrom. In addition to the Dayton airless and the Braender tires, the company will carry Batavia tires.

Winnipeg, Can.—The Winnipeg Garage, Ltd., is voluntarily winding up business and retiring from the motor car trade. The Western Canada Motor Car Co., Ltd., will take over the premises recently occupied by the Winnipeg Garage, Ltd. The new quarters will take care of the large increase in the business of the Overland, Packard and

Hudson agencies, which this company controls.

Menominee, Mich.—The name of the Dugas Motor Car Co. has been changed to that of Dugas Motor and Electrical Co.

Brooklyn, N. Y.—E. H. Morse, who recently conducted a car agency and supply house in Providence, R. I., has been engaged to represent the Emil Grossman Mfg. Co. Inc., among the manufacturers in the territory west of Michigan, including Indiana.

Viola, Wis.—Kinder Bros. of Viola, Wis., have leased their garage and repair shop to Frank Croninger, formerly of Viola, but who has been engaged with a garage firm at Minneapolis for some time. Mr. Croninger is establishing a tire shop.

Denver, Colo.—Ralph I. Lemon, for the past 4 years connected with the MacFarland Auto Co., of Denver, and Wyoming distributor for the Buick and Packard cars, has gone to Colorado Springs and opened an accessory store under the name of the Colorado Springs Auto Equipment Co., a branch of the Denver Auto Equipment Co.

Recent Agencies Appointed by Motor Car Manufacturers—Continued

PASSENGER CARS

Town	Agent	Make	Town	Agent	Make
Holly, Mich.	J. R. Inskeep	Grant	Spokane, Wash.	Maylan-Reilly Auto Co.	King
Houston, Tex.	Young & Dwire	King	Savage, Minn.	Geo. Allen	Dort
Jackson, Mich.	Temple Garage Co.	Imperial	Seville, O.	Bostwick & Sons	King
Joplin, Mo.	J. W. Gersuch	Koehler	Sherbrooks, Que.	Dominion Distributing Co.	King
Jefferson, Wis.	Kiltz-Bleck Auto Sales Co.	Overland	Sebring, O.	S. E. McKee	Overland
Kerkhoven, Minn.	M. Irgens	Dort	Sebring, O.	Sebring Auto Co.	Allen
Kiester, Minn.	H. E. Meyer	Dort	San Antonio, Tex.	Guarantee Motor Car Co.	King
Knoxville, Tenn.	King Motor Sales Co.	King	Seattle, Wash.	NePage, McKenny Auto Co.	Paige-Detroit
Kalamazoo, Mich.	George Boyles	Hollister	St. Genevieve, Mo.	St. Genevieve Impl't & Auto Co.	Studebaker
Kalamazoo, Mich.	George Boyles	Chandler	Seattle, Wash.	NePage, McKinney Auto Co.	National
Lewistown, Mont.	Frank E. Doran	Franklin	Sussex, Wis.	Allen Russell	Overland
Lakeview, Mich.	George Johnson	Oldsmobile	Silver Creek, N. Y.	Will K. Miller	Oldsmobile
LaCrosse, Wis.	G. G. Berling	Dort	Seymour, Wis.	August Brandt Auto Co.	Ford
Lexington, Tenn.	Brown Bros.	Studebaker	Springfield, Mass.	Philbrook Motor Car Co.	Briscoe
Long Beach, Cal.	Bernard Gunsul	Detroit	Scranton, Pa.	Charles E. Heckel	Grant Six
Lebanon, Tenn.	John Cowan	Moon	Spokane, Wash.	W. J. Maxwell	Franklin
Long Beach, Cal.	Schilling & Evans	Pullman	Schenectady, N. Y.	Frank Fonda	Studebaker
Lynchburg, Va.	Bowles Auto Repair Co.	Koehler	Toledo, O.	Lichtle Auto Co.	Chandler
Marshall, Mich.	G. D. Mill	Dort	Toledo, O.	J. Earl Cunningham	Monarch
McKean, Pa.	F. X. Bowman	King	Toledo, O.	Cornelius-Browning Auto Co.	Inter-State
Marion, O.	S. L. Leeka	King	Toledo, O.	Weed Automobile Co.	Reo
Marion, O.	S. L. Leeka	Grant	Toledo, O.	Grasser Motor Co.	Hupmobile
Marion, O.	E. N. Lucas	Hupmobile	Toledo, O.	Atwood Automobile Co.	Overland
Marion, O.	Auto Inn	Hudson	Toledo, O.	Automobile Distributing Co.	Regal
Manchester, N. H.	Brodie Electric Co.	Cadillac	Tooele, Utah	J. H. Tate	Oldsmobile
McKinney, Texas	R. L. Crockett	Studebaker	Trade Lake, Wis.	E. Early	Dort
Manchester, N. H.	Bourne & Stone	G. M. C.	Three Rivers, Mich.	C. C. Doubherty	Dort
Manchester, N. H.	E. W. Edgar	Winton	Turtle Lake, Wis.	M. Liesz	Dort
Muncie, Ind.	Jas. E. Sturgeon	Dort	Toronto, Ont.	Dominion Distributing Co.	King
New Rockford, N. D.	J. R. MacKenzie	Dort	Taylor's Falls, Wis.	C. M. Hermanson	Dort
Newark, O.	W. B. Nye	Kissel	Villard, Minn.	Villard Auto Co.	Dort
Memphis, Tenn.	G. L. Sloan Auto & Machine Shop	King	Vevay, Ind.	H. B. Dupras	Studebaker
Nashville, Mich.	Tuttle & Burd	Studebaker	Vancouver, B. C.	A. S. French Auto Co. Ltd.	King
Osage, Ia.	Gardner Motor Co.	Studebaker	Waterford, Wis.	J. L. Milligan	Kisselkar
Ogilvie, Minn.	V. E. Holmgren	Dort	Wild Rose, Wis.	McKenney & Nelson	Kisselkar
Upsala, Minn.	Upsala Motor Co.	Dort	Wichita, Kans.	Heskett & Myers	Herff-Brooks
Oshkosh, Wis.	Smith & Neville	Kissel	Wheeling, W. Va.	Wesley A. Baumberger	Allen
Oklahoma City, Okla.	Stapleton Motor Sales Co.	King	Wausau, Wis.	Benj. S. Cox	Kisselkar
Palisade, Nebr.	D. H. Farmer	Studebaker	Wichita, Kan.	M. A. Maclean	Oldsmobile
Parker Prairie, Minn.	Math. F. Freske	Dort	Whitefield, N. H.	The Stoughton Co.	Dort
Providence, R. I.	A. J. Howard	Scripps Booth	Warren, Minn.	Wm. Erickson	Dort
Pasadena, Cal.	H. L. Nelson	Pathfinder	Wescott, Minn.	F. W. Berfelz	Dort
Portsmouth, O.	F. E. Bower	Overland	Wilmot, S. D.	Welch & Minder	Dort
Phoenix, Ariz.	Oscar Irvin	Mitchell	Winthrop, Minn.	F. N. Nelson	Dort
Boulder, Colo.	Avery Auto Co.	Apperson	Waconia, Minn.	Geo. Ittel & Sons	Dort
Portland, Mich.	Barton Bros.	Dort	Wadena, Minn.	B. O. Cuddigan	Dort
Pine Bluff, Ark.	J. F. Rutherford	Oldsmobile	Wheeler, Wis.	Martin Lefstad	Dort
Perham, Minn.	Kokowski Bros.	Dort	Welcome, Minn.	H. W. Krumweide	Dort
Rexville, Minn.	W. Sander & Co.	Dort	Winnipeg, Man.	Canadian Motor Co.	Oldsmobile
Redford, Mich.	F. E. David	Oldsmobile	Watkins, Minn.	John J. Thels	Dort
Redondo, Cal.	Marshall Craig	Pullman	Wellsburg, W. Va.	Chas. H. Beall	Dort
River Falls, Wis.	Ramer Auto Co.	Dort	Walla Walla, Wash.	Moore Auto & Supply Co.	King
Rochester, Ind.	Frank Stinson	Oldsmobile	Wellsville, O.	Automobile-Machinist Co.	Oldsmobile
Rock Rapids, Ia.	Holliday Bros. & Smock	Studebaker	Waukesha, Wis.	George Savage	Studebaker
Russell, Minn.	R. E. Benson	Dort	Youngstown, O.	Fred Ragan	Dodge
St. Cloud, Minn.	M. Besenius	Dort	Youngstown, O.	Albaugh Motor Sales Co.	Saxon
Spooner, Wis.	Sutler, Simpson & Stengal	Dort	Yankton, S. D.	E. F. Nyberg	Oldsmobile



The Motor Car Repair Shop



OWNERS and garage men often lost sight of the fact that silent chains, now used in motors for camshaft and electrical-unit drive, are sets of small bearings which call for as much attention as do any of the bearings in any good piece of machinery. They must be well lubricated and kept free of foreign matter which would wear them unduly. Each joining stud and rivet of the chain must be regarded as a bearing for several of the little links, ranged side by side and end to end to make up the chain. Unless suitable oil properly applied is the rule, inefficient and noisy working and rapid wear are inevitable.

To clean the silent chain—and this should be done every time the motor is taken down—it should be soaked in a bath of kerosene, and a brush used to get off every particle of grit and dirt. Having cleaned the chain, drain off the kerosene. The best way is to wash it off the chain in hot water to which a small amount of washing soda has been added.

Next put the chain in a bath of lubricating oil of a moderately heavy grade and let it soak until the lubricant has reached all the points of bearing surface. It is better to have this oil somewhat warm to insure good results.

In lubricating the chain in practice, the best way is to put the oil on the inside as this part comes directly in contact with the sprockets. It is convenient to have an oil brush to distribute it along the chain surface.

This, of course, applies to chains which are exposed. It is taken for granted that some proper provision for constantly lubricating an inclosed chain is provided by the manufacturer.

Open chains require oil treatment once a day, and this is true particularly if they are running all the time, as in some motor-generator drives.

It is a very bad practice to put a hard lubricant on a silent chain, as it really defeats the purpose for which it is applied, since it is almost impossible for it to reach the bearings itself, and also prevents other lubricant from doing so. By hard lubricants are meant such materials as greases and tallowes which have no tendency to flow.

While on the subject of chains, some remarks on the roller type of chain, used especially on trucks as a means of power transmission, as regards oiling and care, may not be out of place. The ways of cleaning these chains are similar to those mentioned above for the silent type. But, in contrast to the silent chain method of lubrication, stiff greases, graphite or tallowes are recommended if the chains work in the open air, as most of them do.

Proper Care of Silent Chains

One chain manufacturer recommends heating the grease or tallow until it becomes somewhat fluid, after which the chain is put in it, being allowed to remain in it for an hour or more. Then chain and lubricant are cooled together, following which the grease should again be heated, and the chain removed from it and allowed to dry. It is then ready for use. Such treatment is desirable once a week if the car or truck is in daily service. It is surprising how this care will add to the efficiency of the vehicle, and tend to reduce noise, and consequently, chain wear.

Simple Battery Charging Apparatus

Several years ago when the electrically-equipped car was the exception rather than the rule, there was no special need for garage apparatus to do small charging work, but now that nearly every car carries a storage battery, some form of small battery charging apparatus is almost an essential in the well-equipped shop. It is bad business to have to turn away customers who need this kind of service on account of lack of equipment, especially when that equipment entails no great outlay.

Several good charging sets which transform alternating current to direct are on the market at prices around \$25, and they will soon pay for themselves, as the customary fee for battery charging is 25 cents in most cities.

In a majority of towns, the current supplied is alternating and as direct current is required for battery charging, some apparatus must be used to change from alternating to direct. The motor-generator set will do this work, but there must be a power drive for former with no moving parts, and which gets its power

from the ordinary lighting circuit, is the most convenient form of apparatus to use. In addition, the specially constructed transformer sets, which have been brought out for garages in order to take care of small battery work, step down the lighting circuit voltage to a low voltage suitable for the work.

Of course, if the current supplied from the central station is direct, no rectifier is required, but it is not often that this is the case.

As an example of the type of rectifiers which are on the market for garages, that shown in Fig. 1 is good. This is made to conveniently plug into the ordinary lamp socket, and is arranged to be attached to the wall. Several makers of electrical apparatus can supply these. That shown is made by the St. Louis Electrical Works, St. Louis, Mo.

The principle of the transformer of this type is not of special interest here. Suffice it to say that it is of the two-coil type, and to one end of the low voltage winding is connected, through an armature and platinum make-and-break contacts, one lead of the battery. The other end of the low voltage winding of the transformer is connected through a resistance to the other battery lead. Opposite the armature there is a magnet which is designed so that only the leakage magnetism acts upon the armature. This magnetic force, in connection with the magnetism of the electromagnet which is operated by the alternating current from the transformer, causes the vibration of the armature at the same frequency as that of the alternating supply current. Whenever the alternating current is in the right direction, the contacts close, sending it into the battery as continuous or direct current.

These devices are simple to operate. Having plugged the transformer into the lamp socket, the positive wire of the battery is connected to the charging terminal marked positive, or (+), and the negative, or (—), wire of the battery connected to the corresponding transformer lead. Then the apparatus gives the storage battery the tapering charge it requires automatically.

A transformer of the size shown is capable of charging three-cell batteries of 6-volt type. It will charge either 60-, 80-, 100- or 120-ampere-hour batteries at a rate of 6 amperes. Smaller batteries can be charged by it by interposing resistance in series with the battery leads to cut down the charging current. Of course, larger transformers, ranging in price from \$40 or \$50 to \$100 depending upon the number of batteries which can be charged at one time, are obtainable, as well as other types which work on a different principle.

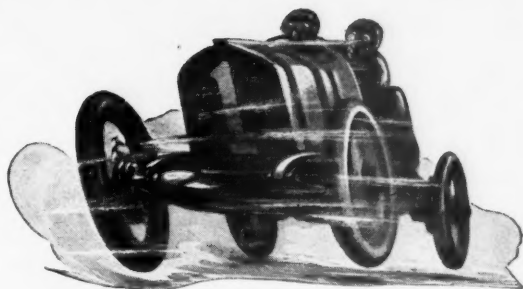


FIG. 1—SIMPLE RECTIFIER
Used for changing alternating to direct current



Champion

TOLEDO MADE FOR THE WHOLE WORLD'S TRADE



Spark Plugs Developed Under Racing Conditions

An owner would never subject his motor to such strains as we put upon an engine to discover any weakness in the spark plug which we design for it.

Even after perfection has apparently been attained, we test these plugs time and time again, in the motors for which they are intended, under every conceivable speed and load strain.

Dealers everywhere know just how Champions are "trained" to "stand punishment" without weakening and to "deliver the punch" required of them.

Because Dealers recommend Champions so intelligently they earn a share in our profits which we are glad to divide with them.

Any dealer whose strong box does not already contain our 1915 Profit Sharing contract should ask his Jobber Salesman about it or write us at once.

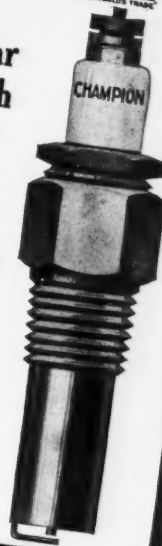
Champion Spark Plug Co.
1505 Upton Ave., Toledo, Ohio



Regular
1/2 inch
Extra
Long

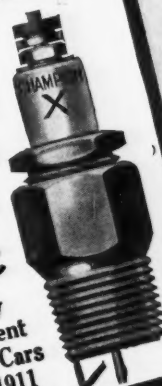
Price
\$1.00

Factory
Equipment
on all
Metz Cars



X
Special
1/2 inch
Price
75c

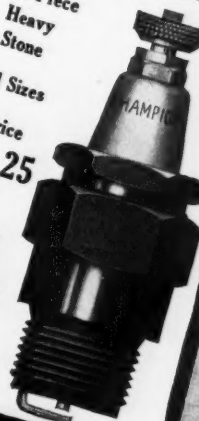
Factory
Equipment
on Ford Cars
since 1911



Two-Piece
Heavy
Stone
All Sizes

Price
\$1.25

For High
Powered
automobiles,
trucks and
Stationary
Engines



SCHEBLER

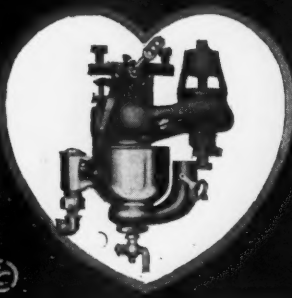


Dependable in any emergency

Fire engines - fire insurance patrols—police and hospital ambulances—in fact most motor vehicles upon whose *prompt* and *certain* arrival depends the property, the lives, the safety of the commonwealth, are regularly equipped with SCHEBLER—

The Universal Carburetor

In the illustration a Schebler-Equipped Fire Engine is shown in action. In the choice of a carburetor for your car let yourself be guided by the judgment of those who deem the best obtainable just good enough. Demand SCHEBLER!



Wheeler & Schebler
Indianapolis • Indiana



A Pumpelly Battery will Replace any of these

Something New in Storage Batteries

The frailty and uncertainty of the storage battery has been the great drawback of the industry. No department of electrical science has offered greater difficulties.

The first great battery expert of the country was Pumpelly.

The basic principles of all successful battery construction today are those developed by Pumpelly thirty years ago.

Three decades of tireless work have been put in since then by Pumpelly. A member of a very wealthy family, he has been able to take his time to perfect his ideal battery.

Many able engineers have assisted him in this development. At last he has achieved his purpose.

A tremendous advance in battery construction is marked by the improved Pumpelly Battery.

Its marvellous efficiency and durability have proved a revelation to the engineers of the biggest automobile factories and electrical stations of the country. They have submitted it to the most searching tests they have been able to devise. As a result—

We have their contracts for batteries. That's fair proof that their astonished praises are not mere friendly words.

Big Business is the natural, inevitable result of such a remarkable product. We have prepared for it in three ways—and are preparing for it in a fourth.

Pumpelly Batteries

A Battery for Every Type of Starter — A Battery for Every Car

Low factory costs mean that this wonderful battery competes in price with the old-type batteries.

Large manufacturing capacity means immediate shipment of your order, whether it is for one battery or for 1,000 batteries.

Batteries for every size and shape of box are kept in stock in ample quantities. You can replace any known make of battery with a Pumpelly and you can have it shipped at once.

We make a battery for every type of starter—a battery for every make of car.

A country-wide Service System is being rapidly built up. We have over thirty service and sales stations now. We are organizing more just as fast as they can be properly equipped for good work.

If your battery is "shot," ask your garage man to put in a Pumpelly or write to us. It will fit your box. It will conform to your wiring. It will cost you no more than the old type.

And it will give you at least 30% more efficient service and last longer.

Service Stations

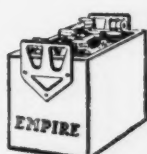
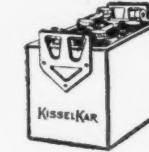
New York, N. Y.—J. C. Nichols Co., 1673 Broadway.
Chicago, Ill.—Gray-Heath Co., 1429 Michigan Ave.
Philadelphia, Pa.—Carlisle & Doughty, 846 North Broad St.
Boston, Mass.—Basle Elec. Co., 36 Cambria St.
Cleveland, O.—M. & M. Co.
Kansas City, Mo.—E. S. Cowie Elec. Co., 1517 Grand Ave.
Buffalo, N. Y.—Elsenhans Machine Co., 500 Washington St.
Rochester, N. Y.—Chapin-Owen Co., 480 Main St.
Milwaukee, Wis.—Lemke Elec. Co.
Baltimore, Md.—Auto Elec. Co., 1902 N. Charles
Omaha, Neb.—J. Carr Elec. Co., 208 S. 19th St.
Vancouver, B. C.—Wood, Vallance, Leggat; also
Winnipeg, Manitoba, and Calgary, Alta.
Toledo, Ohio—Union Supply Co., 231 Superior St.
Minneapolis, Minn.—Consumers' Battery Co.
Grand Rapids, Mich.—Kent Elec. Co.
Los Angeles, Cal.—Auto Motor Equip., 717 S. Olive St.
Menominee, Mich.—Dugas Motor Co.
Atlanta, Mo.—E. H. Huffman.

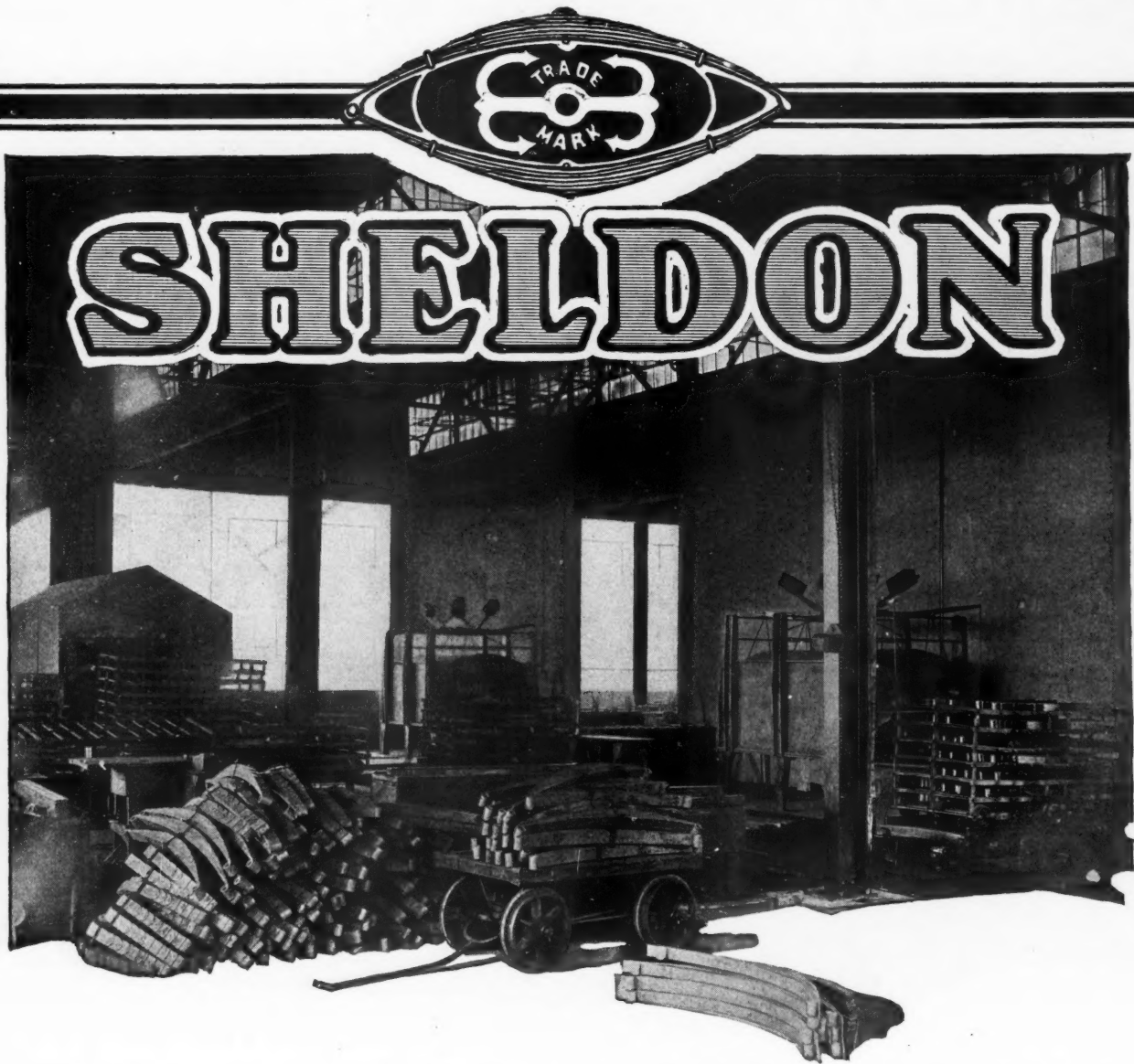
Dawson, Minn.—Power Accumulator Co.
Appleton, Wis.—Kurz & Root.
Hamilton, Ont.—Toronto & Ham. Elec., 99-103 McNab St.
Fargo, N. D.—More Brothers.
Davenport, Iowa—Bashaw's Elec. Co.
Des Moines, Iowa—C. F. Stewart, 1001-3 Locust Street.
Henderson, Iowa—Workman Auto Co.
Indianapolis, Ind.—Indiana Elec. Service.
Elkhart, Ind.—Brice H. Reid Co., 211 So. Main St.
San Diego, Cal.—J. Stanley LaSha Co., 1589-41 5th Street.
New Britain, Conn.—G. K. Spring Co., 79 Church Street.
St. Louis, Mo.—Gen. Storage Battery Co., 2005 S. Locust St.
Washington, D. C.—Fidelity Electric Garage, 1420 U St. N. W.
Pittsburgh, Pa.—Godfrey Storage Battery Co.
Williston, N. D.—Messrs. Stice & Jensen.
Louisville, Ky.—F. L. Yeth.
Sioux City, Iowa—Electric Garage Co., 615 Nebraska St.

Pumpelly Battery Company Indianapolis Indiana



When Writing to Advertisers, Please Mention Motor Age





For the quarter century just passing we have held the dominating position in the vehicle industry—particularly the last fifteen years, during which time we have specialized on the development and production of springs of all types and sizes for the various kinds of motor driven vehicles.

In all this time we have never been able to discover any actual practical merit in features.

As time goes on the more firmly we are convinced that the relative value of anything other than scientific design—exact selection of materials—skill in heat treating—absolute integrity in applying the lessons learned from break-down tests is nil.

In arriving at this conclusion we are not alone, for the experience of the world's foremost automobile engineers has substantiated it.

The above illustration shows a section of one of our heat treating departments where one of the most important stages in the manufacture of Sheldon Springs takes place.

In this department the equipment is more complete and up-to-date, practice is more exact, and the skill and experience of the operatives—from engineers down—more comprehensive than can be found anywhere else in the world.

THE SHELDON AXLE & SPRING COMPANY

Makers of Springs and Axles for Heavy Duty Service for More than 50 Years

WILKES-BARRE

Chicago:
122 S. Michigan Blvd.

Detroit:
1215 Woodward Ave.

San Francisco:
444 Market St.

PENNSYLVANIA



"Current" Topics

What is electricity?

In the case of a storage battery it is "canned energy," capable of making motoring a joy forever instead of a long, dark, "turn the crank" incident in one's life.

Without electricity the modern motor car isn't modern. With it the car becomes a veritable "pleasure wagon." But you can't have electricity without a live storage battery.

Be on the safe side. Make sure your battery is in good condition. Give it pure water. Test it with a hydrometer. Then if you have trouble, go to the nearest Willard Service Station.

85% of American makers of electrically equipped motor cars depend upon Willard superiority of construction and Willard service for long, dependable performance.

Willard Storage Battery Company

Cleveland, Ohio

New York Branch: 228-230 W. 58th St.
Chicago Branch: 2524-30 S. Wabash Ave.

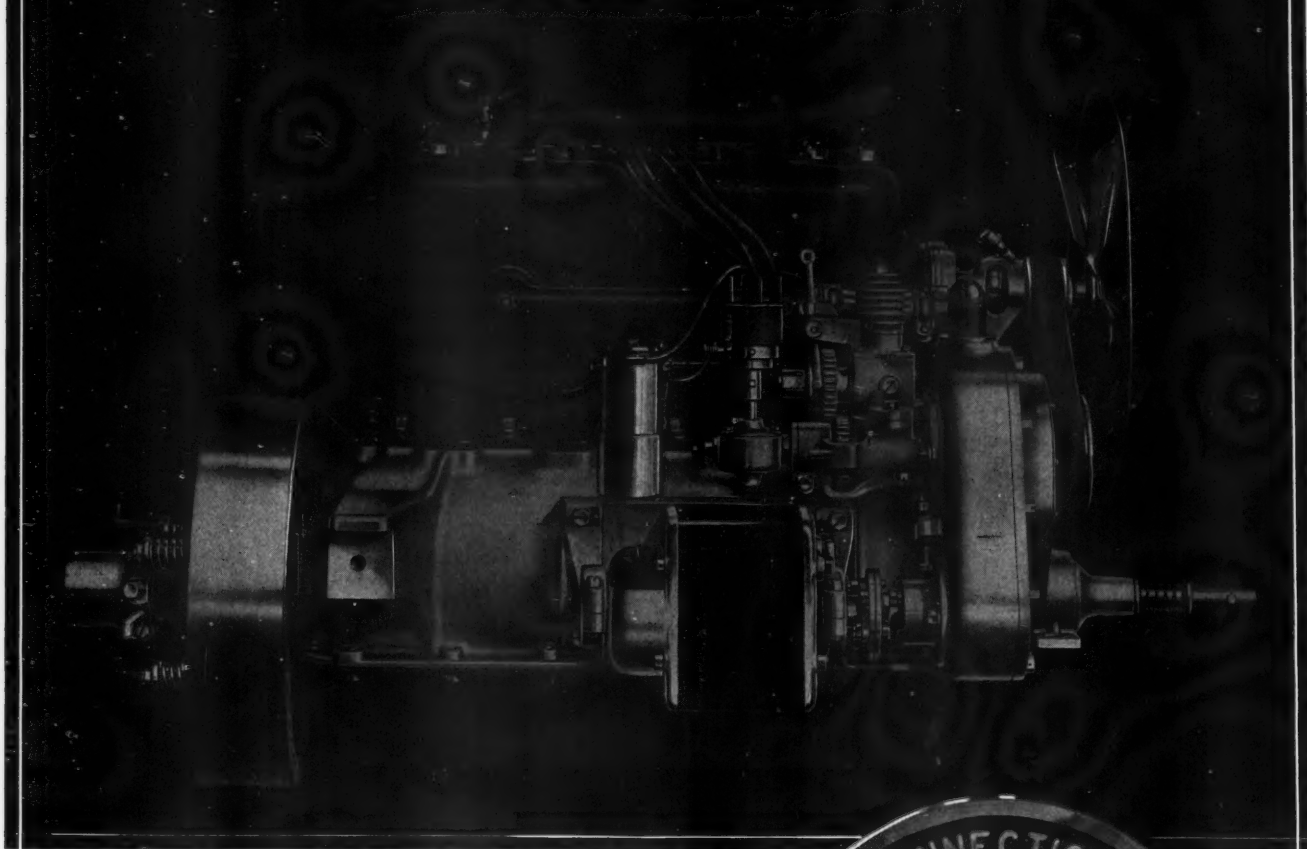
Indianapolis Branch: 318 North Illinois Street

Detroit Branch: 736-38-40 Woodward Ave.

San Francisco Branch: 821 Monadnock Bldg.

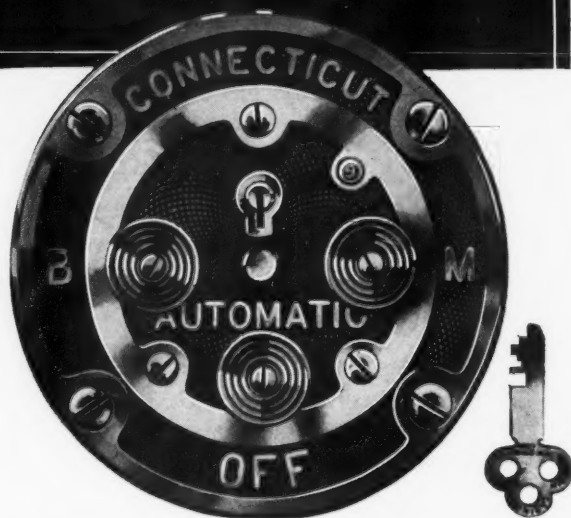
Service Stations in All Principal Cities in the United States, Canada and Mexico

AUTOMATIC IGNITION CONNECTICUT



Consider Ignition from the Way It Works with the Motor

A certain type of ignition may be ever so wonderful from purely an electrical standpoint—another may seem to possess some distinct mechanical advantage, but not one of the ignition systems on the market today can compare with CONNECTICUT AUTOMATIC IGNITION in the way it meets all the requirements of the motor in the quality of its spark. This is the most practical thing an ignition system can do—and CONNECTICUT AUTOMATIC IGNITION does it automatically.



Some systems either deliver a spark of uniform quality at all speeds or—as in the case of the magneto—a spark which changes its quality absolutely contrary to the requirements of the motor.

While CONNECTICUT'S spark at the highest attainable speeds is equal to, if not better than the magneto's best effort, as motor speed decreases and the mixture becomes poorer, the CONNECTICUT spark grows stronger—until for starting and at slowest speeds it delivers its hottest spark.

This is the most practical advantage ever developed in the history of ignition.

It is what enables a motor equipped with CONNECTICUT AUTOMATIC IGNITION to show results in dynamometer tests superior to others—and to give power, flexibility and general results far in excess of a similar motor equipped with any other system of ignition.

CONNECTICUT TELEPHONE & ELECTRIC COMPANY, Inc., Meriden, Conn.

We announce
the

Stewart Starter for Ford Cars

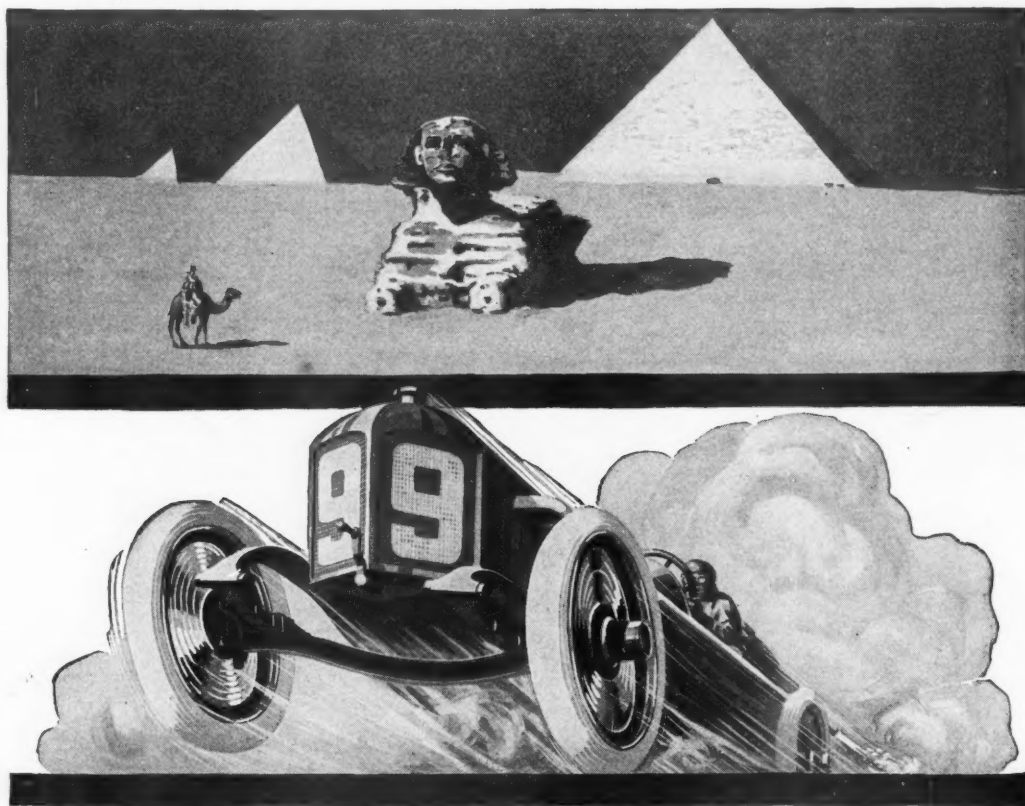
The price will be astonishingly low

Wait for the Stewart Starter
or you'll be sorry



(Watch for announcement No. 3
Next Week)

When Writing to Advertisers, Please Mention Motor Age



At Every Motor Speed and Temperature

A steady flow of *power*—the delight of every motorist—*should* be obtainable in any standard make of motor in any climate, every day. It is often a question of *lubrication*.

Polarine is the efficient, *dependable* motor oil which accomplishes this result. It main-

tains the correct lubricating body at *every* motor speed and temperature.

It *protects* the motor and *keeps* it in good running order while assisting it to *develop* its fullest power. A smooth film of *durable* oil constantly covers all frictional parts.

Polarine

FRICION REDUCING MOTOR OIL

Nearly 7,000,000 gallons, used in the Middle West alone last year, testify to popularity, which is always the result of efficiency.

Polarine is made by the specialists in the manufacture of automobile fuel and lubrication—the

STANDARD OIL COMPANY

(AN INDIANA CORPORATION)

Chicago, U. S. A.

Use RED CROWN Gasoline, too—every gallon of which contains extra heat units that mean extra power, speed and mileage

More "Proof by Performance"

*Chicago Daily News,
Friday, Apr. 9.*

HOLD FUEL TEST IN LOOP AND COUNTRY

**C. A. C. Officials Find Run
Through Congested Traffic
Doubles Gas Cost**

USE MARMON "41" CAR

**Crisscross City's Business District
for 10 $\frac{1}{4}$ Miles and Same Dis-
tance on Road.**

BY C. G. SINSABAUGH.

"Crisscrossing the loop of Chicago's business district, a distance of ten and one-half miles, the Marmon averaged exactly seven and three-quarter miles to the gallon, while on the two and one-half mile circuit east of the Illinois Central railroad tracks, where the conditions are such as one finds in the country, the Marmon Six did fifteen and three-quarter miles to the gallon for exactly the same distance as it covered in the loop."

* * * * *

*Chicago Evening Post,
Friday, Apr. 9.*

MARMON LOOP TEST IS MADE ON HIGH GEAR

**Model "41" Does "Gridiron"
Task on 1,355 Gallons of
Gasoline, Covering
10.5 Miles—67
Stops**

By E. G. Westlake

"Threading the Loop on the High" is the story of motor tests that a Marmon 41 model furnished the plot for a record-making performance yesterday afternoon under the direction of Messrs. Darwin Hatch and E. G. Westlake of the Chicago Automobile Club's technical committee.

It was successful in every detail, proving not only the flexibility of a motor in an intensely congested traffic area but the triumph of the Marmon type of cone clutch.

*St. Louis Post-Dispatch,
Friday, Apr. 2.*

TO DE SOTO AND RETURN GEARS SEALED IN "HIGH"

To De Soto, Mo., and return, with the gear lever sealed in "high" was the feat accomplished by J. T. Salisbury, in a Marmon "41" stock touring car with a full load of five passengers last Tuesday.

* * * * *

*St. Louis Globe-Democrat,
Friday, Apr. 2.*

Fine Record Made by Marmon Car on "High"

A trip from St. Louis to De Soto, Mo., and back in a Marmon touring car with the gear lever sealed in high was made Tuesday.

The Easiest Riding Car In The World



MR. DEALER:

How would you like to sell a car which you can back by the offer to out-demonstrate, out-perform, out-do any other make of car at any price?

Detailed descriptions of the proofs mentioned in these representative newspapers, as well as other proofs by performance under all conditions, will be sent you on request.

**NORDYKE &
MARMON CO.**

(Established 1851)

Indianapolis

Indiana

Over Sixty Years of Successful Manufacturing

*Paterson, N. J., News,
Thursday, Apr. 1.*

A WONDERFUL RIDE IN A WONDERFUL CAR

Marmon Stock Car Negotiated Schumann-Heinke Hill on the High Speed, Carrying Four Passengers Over the Crest at 23 Miles an Hour.

"It was a wonderful exhibition of a wonderful car. There was no noise, no vibration of the motor, no effect. It was all smooth, simple, easy. The seats simply gripped one in the back and the engine pulled, powerfully, uncomplainingly, efficiently. It was more nearly like flying than anything else as the long, graceful car skimmed over the ground and raced up the hill."

* * * * *

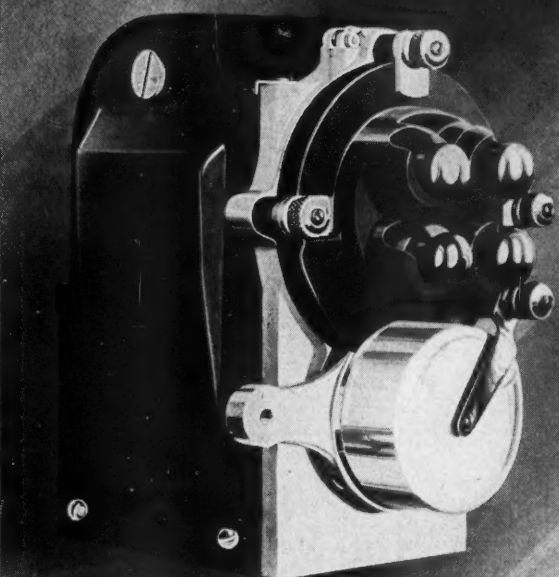
*Kansas City Star,
Wednesday, Feb. 10.*

UP "STEEPEST HILL" AT 47 MILES

**A Marmon Car Broke Its
Own Record This
Morning**

A stock model Marmon "41" broke its own record, established last November, on Reservoir Hill this morning. The 5-passenger, 6-cylinder car attained a speed of 47.5 miles an hour at the top of the steepest hill in Kansas City. Last fall a record of thirty-five miles an hour at the top, which had stood for years, was smashed by the Marmon when it traveled forty-two miles an hour all the way up the hill.

DIXIE ***20TH CENTURY*** ***MAGNETO***



A Full Spark at Lowest Engine Speed

—lower than anything believed possible, and at barely walking pace—that is what is delivered by the

20th Century DIXIE

There is no dependence on battery here — no careful nursing when position of advance lever is changed—just a high-tension magneto, self-contained and independent, which consumes its charge with a vicious spark at the lowest as well as the highest speeds.



Splitdorf Electrical Co.
NEWARK, N. J.

(All SPLITDORF features are fully covered by patent or patents pending)



Complete



TYPE L KLAXON
\$20



TYPE L KLAXONET \$15



KLAXET \$9



HAND KLAXON \$7.50



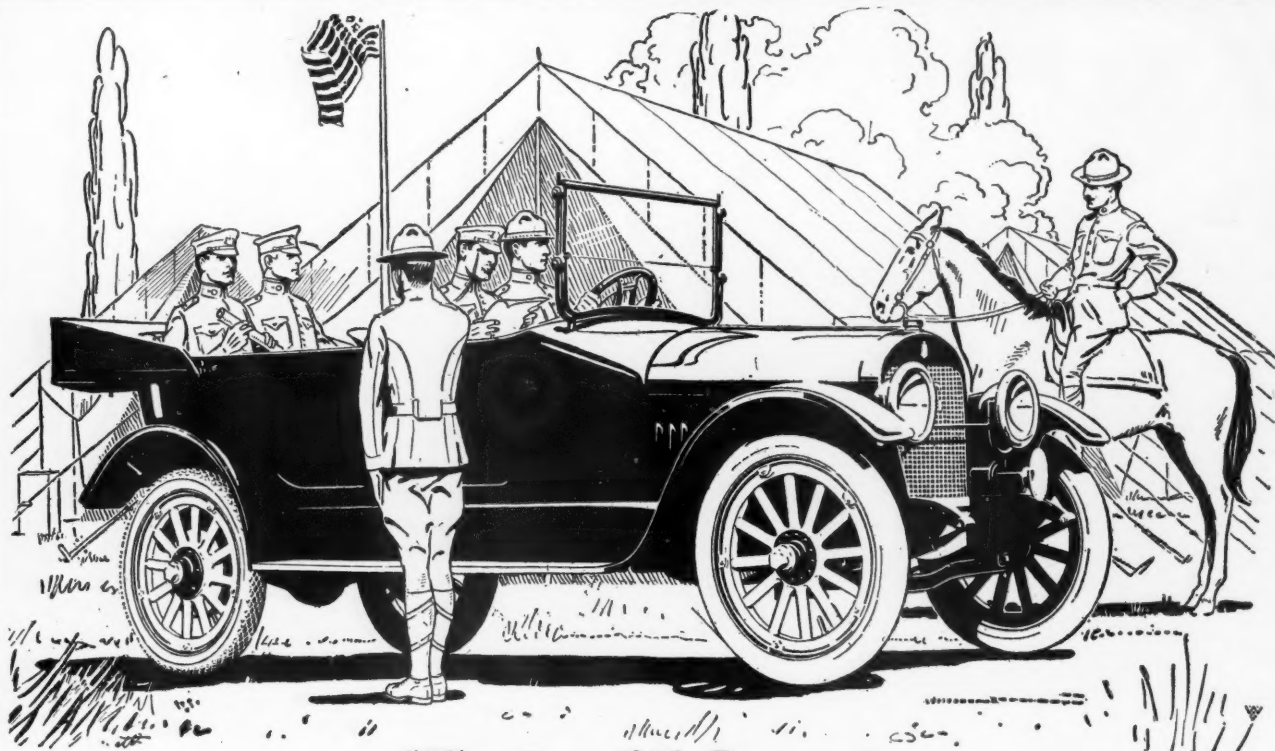
HAND KLAXONET \$4

KLAXON is the only complete signal line. There are twenty-one different types. There is a Klaxon for every kind and size of car—for trucks, for motorcycles, for boats. Each has Klaxon quality built into it. Each carries the Klaxon permanent guarantee.

Klaxon is the one signal line on which the dealer is given absolute protection. Klaxon prices and Klaxon dealer discounts are standard the country over.

Klaxon is the line dealers are *sure* of. The demand has been created. Klaxons are easy to sell. Car owners know them, ask for them, have confidence in them.

LOVELL-McCONNELL MFG. COMPANY
MAKERS OF THE "KLAXON" NEWARK·N·J.



"The Car of No Regrets"



\$1350
COMPLETE

EIGHT CYLINDER KING



40-45
HORSE POWER

Out-Performs All Other Types

The extraordinary success of this super-car can only be understood by a ride behind its engine

A believable description of the King "Eight" in action defies even "advertising" English. It is a performance that must be "felt"—and exulted in.

The superior flexibility of an "eight" is beyond argument or dispute. It is an immutable mechanical fact that an "eight" has one power impulse for every 90 degrees of crank rotation, as against the 120 degrees of a "six" and the 180 of a "four."

This almost "turbine" smoothness of operation means *more* than the mere avoidance of gear-changing for practically all speeds and grades: It reduces vibration to nearly nil, which in turn results in silence and longevity and adds to riding comfort.

Notwithstanding its greater number of cylinders and

40-45 horse-power, the King "Eight" gives 15 to 20 miles to a gallon of gasoline, and 800 to 1000 miles to the same measure of motor oil. Thus, low operating cost is added to the car's other virtues.

The King "Eight" is *not* an experiment, but the same successful type of car made by celebrated European builders for the past six years. It is King designed and King manufactured and has many hundreds of miles of grueling road tests behind it. Enthusiastic owners all over America, and in many countries of Europe, are making King sales by praise of this wonderful "eight."

What you may *now* expect from a motor car is taught by a King "Eight" demonstration. There's a King agent in your locality.

America's Original Cantilever Spring Car

KING MOTOR CAR COMPANY, 1300-1324 Jefferson Avenue, DETROIT, MICHIGAN

New York Agency and Showroom, Broadway at 52nd Street

Oakes-PUMP-HORN-FAN *Beartone* for FORD

\$12⁵⁰

With Hose and Automatic Gauge.

Horn
in
Center
of
Fan



Oakes-Pump-Horn-Fan \$12.50 F. O. B. Factory.

Oakes-Fan-Pump \$7.50 with hose and gauge complete.

Oakes - Fan - Horn \$5.00, motor driven horn.

The Oakes Co.
Indianapolis, Ind.

ALL three in one assembly. Simply remove the old fan on your Ford and put this Oakes in its place—easily done in ten minutes. Requires no special gears and fittings—you don't have to take off cover on crank case housing. As efficient as it is simple. Pumps only when you want it to inflate tires—merely press lever engaging gear on pump with gear on fan.

Can be detached in a moment and carried in tool box. Single cylinder, 1½ bore by 1¾ stroke; of finest close grain gray iron. Pistons fitted with ground piston rings made by experts who make them for large motor builders. No crank shaft, which saves both weight and cost. Worm gear drive off fan—most powerful drive known. Bronze connecting rod. Improved wick oiler insures perfect lubrication, but no oil spray in tires. Hub is cored, carrying sufficient grease to lubricate bearing for year without oiling. A grease cup on bracket permits oiling of fan while in motion. Every detail is of finest design, workmanship and materials. Furnished complete with air hose and gauge.

A GOLDEN OPPORTUNITY FOR DEALERS

The fact that the name "Oakes" is on this marvelous combination of pump, horn, fan and gauge guarantees its superiority. There is nothing like it on the market.



Press Button to Sound the

Beartone Motor Driven
Sounds Thru Radiator

This is the horn you get with the Oakes-Pump. Hand signals are only makeshifts. This Oakes-Beartone is a motor driven horn with no current consumption. A safer, more efficient horn, PLUS THE BEST OF FANS. Once you put the Oakes Fan on your Ford you will never have to replace it. In logical position under the hood front of the motor. Pulls more air and always keeps radiator perfectly cool. Actually increases the efficiency of motor, saving oil and gasoline. Not an electrical horn. No battery expense. No complicated mechanism; no parts to get out of order and give trouble. Requires no adjusting. Requires no tools—remove old fan and slip Oakes-Beartone in its place.

Automatic Gauge

Set this gauge (yours with the pump) at the pressure you want, say 60 pounds, then go enjoy yourself until it pops off. It won't pump more or less. Automatically stops. Range of this "Nurinkle" gauge is from 40 to 120 pounds. Avoids trouble and saves tires by always giving proper inflation.

TEXACO MOTOR OIL

Holder of A. P. B. A. Gold Challenge Cup Thanks Texaco Motor Oil

WHERE competition is keen, where equipment and motors are expected to give 100% efficiency, you'll more often than not find the winner using Texaco Motor Oil.

The Gold Challenge Cup, awarded each year by the American Power Boat Association, the most important trophy of its kind in this country, was won by Mrs. Paula H. Blackton's *Baby Speed Demon* at the last annual race on Lake George. In acknowledging the co-operation of those who had helped her win, Mrs. Blackton said:—

"The Texas Company looked after my interests so well and had a great deal to do in preventing the engine from making a single miss during all the hundred miles which she covered in the three races."

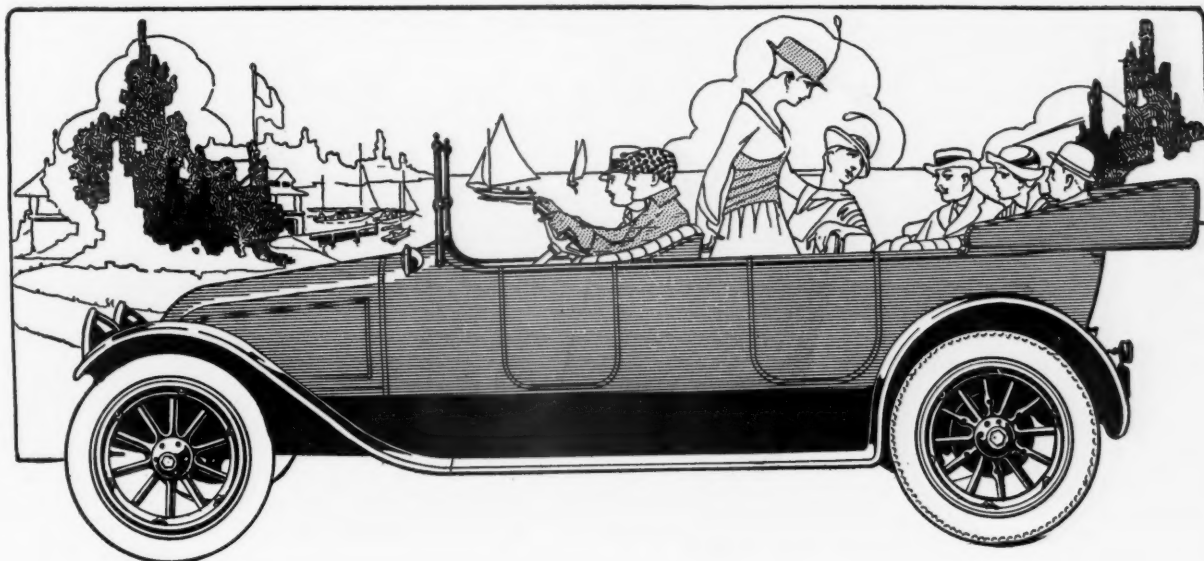
Whether it's for your car, your boat or your aeroplane, you'll find that Texaco Motor Oil will make your motor

deliver the maximum power. It saves gasoline, does not deposit a hard carbon crust and has an unusually low cold test. Try a can.

Sold at good garages everywhere.

THE TEXAS COMPANY
17 Battery Place, N. Y.

The Distinctive Stewart Six



A Car of Rare Motor Personality

Added to its luxury of appointment, added to its wonderful riding ease, added to its superior lasting power, and added to its velvety working mechanism — the Distinctive Stewart at \$1950 is *distinctive*. Its strikingly individual appearance has won the admiration of every one who has seen it.

It has the quality — in practically every detail — to be found in the highest priced American motor cars. And it has a style and smartness, making for personal pride of possession, that you do not get in other motor cars at any price.

You simply cannot secure the same degree of satisfaction from so-called medium priced "sixes" that is yours in the Distinctive Stewart. We stand ready — and willing — to give you the specific evidence that proves our point.

The Distinctive Stewart is the conception of engineers of long experience and high standing in the automobile industry. It is backed by a strong company with a successful record.

Further details of this great car on request. Also information
about the Stewart dealer opportunity

Stewart Motor Corporation, Buffalo, N. Y.

Makers of pleasure and commercial vehicles

HOLLIER "8" \$985

The Most Notable Car of 1915

Eight Cylinders
Electric Lighting
and Starting
112 inch Wheelbase

5 Passenger Body
Long Cantilever Springs
Demountable Rims
Complete Equipment

The Dealers' Opportunity

Here is a car that possesses the utmost sum total of selling advantages—advanced design, perfect mechanical construction, modern streamline body, a price that eliminates competition and financial backing that insures stability and permanence. It is here to stay. Dealers who sign up with us now will reap the big 1915 profits. Distribution is under way. Write for full details and Selling Terms.

*Eight Cylinder
Electric Lighting
& Starting*

The Lewis Spring & Axle Co.
Jackson, Mich.



No Warning Groan, Whine or Whir-r-r

With the Dyneto your car starts quietly. You have heard some starting systems that make more noise than all the rest of the car put together.

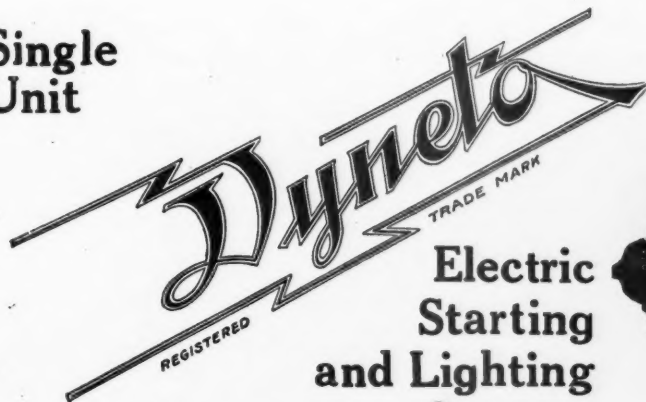


"No Warning Groan"

"You Notice Its Noiselessness"

You simply throw on one switch. Current from the storage battery turns the Dyneto as a motor and it spins the engine quietly. The Dyneto bearings are noiseless; the chains that connect it to the engine are noiseless. This is due to refinement in design, workmanship and material found throughout the Dyneto System. The Dyneto seems to make the car quiet.

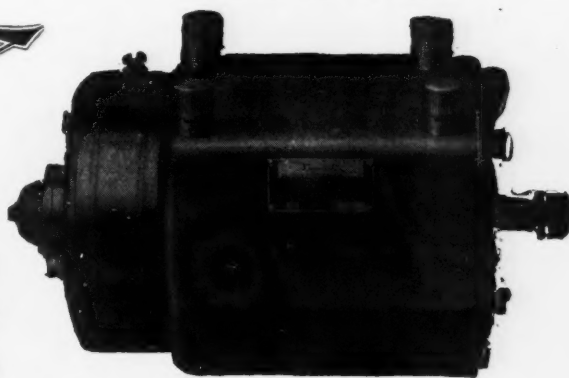
Single
Unit



"Never a Stalled Engine"

Electric
Starting
and Lighting
Systems

Ask Any Franklin
Dealer or Owner



Standard for Franklin, Regal, Ferro, Caille and others

CATALOG AND FULL PARTICULARS ON REQUEST

DYNETO ELECTRIC CO., Syracuse, N. Y.

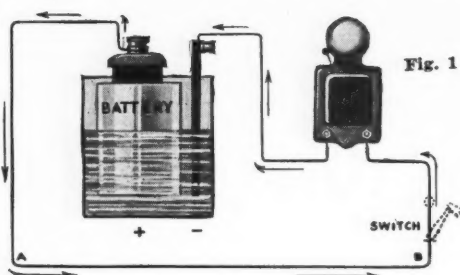
SPECIALISTS IN STARTING AND LIGHTING SYSTEMS USED WITH AUTOMOBILE AND MARINE ENGINES

DELCO

**ELECTRIC
CRANKING**

**LIGHTING
IGNITION**

In the Delco system the framework of the car is utilized as a common return to complete all electric circuits. It is this characteristic which designates the Delco system as a single wire system.



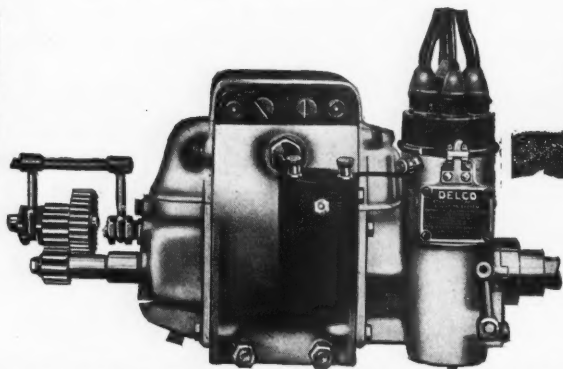
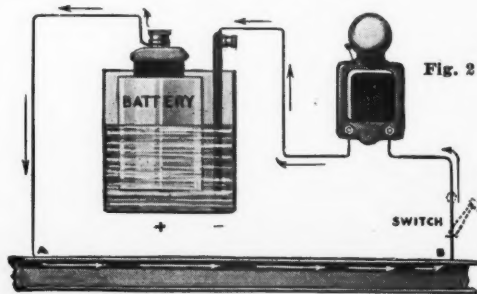
In every current there are two poles, a positive pole and a negative pole. To complete an electrical circuit, so as to get work from that circuit, current must flow from one pole to the other. Under ordinary conditions two wires are necessary to complete this circuit. But in the Delco system only one wire is used for each circuit, the metallic framework of the car being used in all circuits in place of the other wire. This means the elimination of a great many unnecessary wires and plays an important part in the simplification of the system as a whole.

This is particularly true when it is considered that to take care of all the functions of starting, lighting and ignition, operation of horn, etc., there are about ten separate and distinct circuits

included in the term "Delco system," all of which are taken care of by this common return or ground.

The illustrations herewith show graphically the single wire system as compared with the double wire system. In Fig. 1 we have a common electric bell installation. Current flows from the battery, as indicated by the arrows around through the wire to the switch. If this switch be closed, as indicated in the drawing, the current continues through the arms of the switch through the electric bell and back to the negative poles of the battery, causing the bell to ring.

In Fig. 2, we illustrate the same circuit, but in place of using the wire between the points "A" and "B" we simply fasten the wire leading from the positive pole of the battery to the framework of the car at point "A." The current then flows through the framework of the car until it reaches the connection at "B," also attached to the framework of the car, from whence the current flows from the frame of the car at "B" to the switch, through the switch and the bell back into the battery, completing the circuit as in Fig. 1.



The Dayton Engineering
Laboratories Co.
Dayton, Ohio

The ALL-YEAR Car

TWO cars in one—a handsome touring tonneau when the weather makes open driving desirable—a luxurious sedan when the chill of spring or the blast of winter calls for the comfort of a closed car.

All-year driving without the necessity of owning two separate cars or complete interchangeable bodies—that's the service range of the ALL-YEAR KISSEL-KAR. The top can be removed or attached in your own garage—by two men—in fifteen minutes.

Those who are exacting as to the appearance, refinement and completeness of their closed cars—both without and within—find all that they could wish for in a KisselKar with a Detachable Sedan Top attached.

With the top off, it is a most modern, charming and distinctive touring car—the one-compartment type, with individual forward seats and two spacious doors—its hood

and body blending in a yacht-like, unbroken sweep from headlights to 'midships.

The price of the Detachable Sedan Top is but \$350, mounted on either the \$1450 KisselKar 36-Four or the \$1650 42-Six. The price includes all fixtures and equipment.

Write for the specifications and details of this All-Year KisselKar; a new catalog is now ready—send for it.

KISSELKAR

Every Inch a Car

KISSEL MOTOR CAR CO., 121 Kissel Av., Hartford, Wis.

New York, Chicago, Boston, Philadelphia, St. Louis, Cleveland, Milwaukee, Minneapolis, St. Paul, Buffalo, Pittsburgh, Cincinnati, Columbus, Toledo, San Francisco, Los Angeles, New Orleans, Newark, Scranton, Worcester, Seattle, Dallas, Omaha, Nashville, Rochester, Troy, Dayton, New Haven, Hartford, Conn.; Providence, Marshalltown, Cedar Rapids, Montreal, Calgary, Victoria and 300 other leading cities in the United States and Canada.



Sparton Shatters The Air

SPARTON

SAFETY SIGNALS

Always Dependable

HAND OPERATED,
\$4.00

MOTOR DRIVEN,
\$8.00 to \$15.00

*Ready for
immediate
delivery at
all dealers'*

**Your Signal
Must Be as
Dependable as
Your Brakes**

YOU depend upon your
brakes to stop—you depend
on your signal to go ahead.

Sometimes to stop quickly enough
is impossible—there is nothing to
do but go ahead—the Sparton
clears the way.

Model "F"

\$4

*Write for our attractive dealer's offer, including
mounted samples wired for demonstration*

The Sparks-Withington Company
Jackson, Michigan

Hess-Bright Final Winner

Ball Bearing Patent Sustained

THE UNITED STATES SUPREME COURT denied the petition of F. & S. for a hearing, thus confirming the United States Circuit Court of Appeals at Philadelphia, in its decision which established beyond question the validity of Hess-Bright Ball Bearing Patent No. 822723, and whose mandate embraces an order to F. & S. to account for the past, also an injunction against their further infringement.

RAYFIELD

CARBURETORS

30%
faster acceleration!

OF ALL the improved qualities that a Rayfield carburetor will bring out in any motor, a sensitive, leaping acceleration is perhaps the closest to a motorist's heart.

Fully thirty per cent better in acceleration is the average showing of the Rayfield.

Manufacturers of quality cars use this famous carburetor, not because it costs less, for it doesn't, but because it is the best instrument they can secure.

It does the work. That's why more quality cars are equipped with Rayfields than with any other carburetor.

FINDEISEN & KROPF MFG. CO.

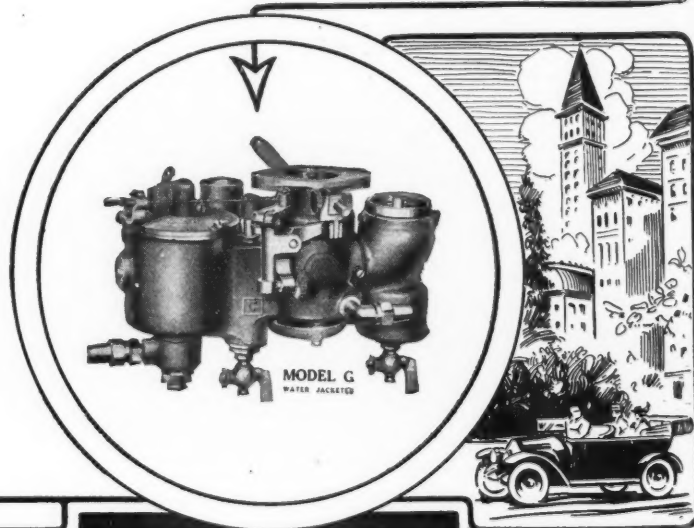
2109 Rockwell Street, Chicago

BRANCHES:

1140 Michigan Avenue, Chicago

1902 Broadway, New York

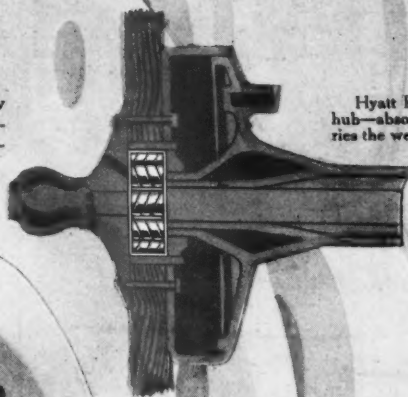
1214 Woodward Avenue, Detroit



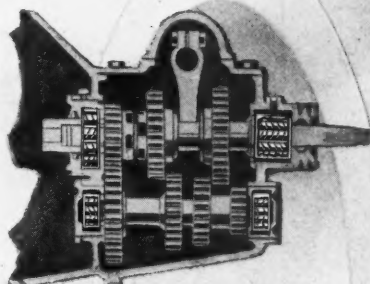


HYATT BEARINGS PREDOMINATE

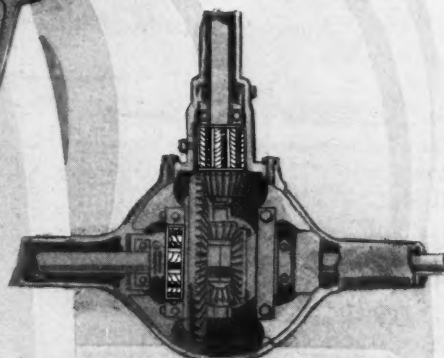
THESE illustrations show where Hyatt Roller Bearings predominate in automobile construction.



Hyatt Bearing in the rear wheel hub—absorbs road shocks and carries the weight of the car.



Hyatt Quiet Bearings in the transmission tend to keep gears and shafts in alignment and insure quiet operation at all speeds.



Hyatt Bearings on the differential hub and pinion shaft take the driving stress and relieve gears and shafts of undue strain.

THE GREAT MAJORITY OF MOTOR CARS MADE IN AMERICA ARE EQUIPPED WITH HYATT QUIET BEARINGS. IN THE REAR AXLE—the transmission—the rear wheel hubs—the jackshafts of motor trucks—in fact, you will find Hyatts at points of great strain in all sizes and types of motor vehicles.

Hyatt Roller Bearings have many advantages that are largely responsible for their wide use. The flexible spiral roller—an exclusive Hyatt feature—cushions road shocks—absorbs vibrations, thus reducing noise—tends to keep gears and shafts in alignment and relieves the surrounding mechanism of undue strain.

In addition, Hyatt Bearings are self oiling, as the right and left spirals constantly circulate the lubricant—and self cleaning, as grit and dirt pass through the spiral slots into the center of the hollow roller and do not grind the bearing surfaces.

Given a little oil occasionally, Hyatt Quiet Roller Bearings will render a care free service that means bearing satisfaction for automobile owners.

"HYATT QUIET BEARINGS"

HYATT ROLLER BEARING CO.

DETROIT CHICAGO
NEWARK N.J.

ILLUSTRATIVE LITERATURE UPON REQUEST



A Little More in Price—but

When you buy a horn you don't want to have to buy another soon after. Do you?

When you pay out your good money you want it back in some form or other.

Don't you?

Then why not pay a little more and get a Model "J" Long Horn?

It'll cost you five dollars, but it's guaranteed for all time.

If any part ever proves defective we'll give you a new horn—that's our guarantee.

Model "J" is hand operated. It requires no current to operate. The first cost is the only cost. And it's not a "makeshift," it's a REAL horn.

See the Long Horn dealer today. Booklet on request.

J-M LENS



CARTER CARBURETOR



JOHNS-MANVILLE SHOCK ABSORBER



JOHNS-MANVILLE SERVICE

COVERS THE CONTINENT

J-M (MEYER) SOOT-PROOF SPARK PLUG



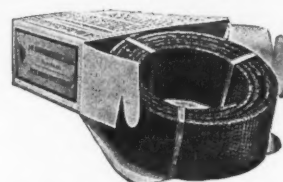
J-M AUTO CLOCKS



J-M TIRENEW



J-M Non-Burn Brake Lining



A Brake is No Better than its Lining

If the lining is not efficient the brake mechanism can't be. In fact it's actually the lining that MAKES the brake. When your brakes are lined with J-M Non-Burn they hold.

They hold because J-M Non-Burn is possessed of unyielding, relentless gripping power—power that makes itself felt every time you apply the brake—power that you know is "there" for the emergency that's some time sure to come.

It doesn't pay to compromise on quality and buy a little cheaper lining. The stakes are too great.

Ask your dealer for J-M Non-Burn. If necessary, INSIST.

J-M Non-Burn is supplied in CUT SIZES, packed in individual cartons, for all popular makes of cars. Booklet on request.

8115

H.W. JOHNS - MANVILLE CO.

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Toledo
Washington
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Youngstown

THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED

Toronto Montreal Winnipeg Vancouver

THE BEARINGS COMPANY & AMERICA

F&S ANNULAR BALL BEARINGS

▮ BALL THRUST BEARINGS ▮

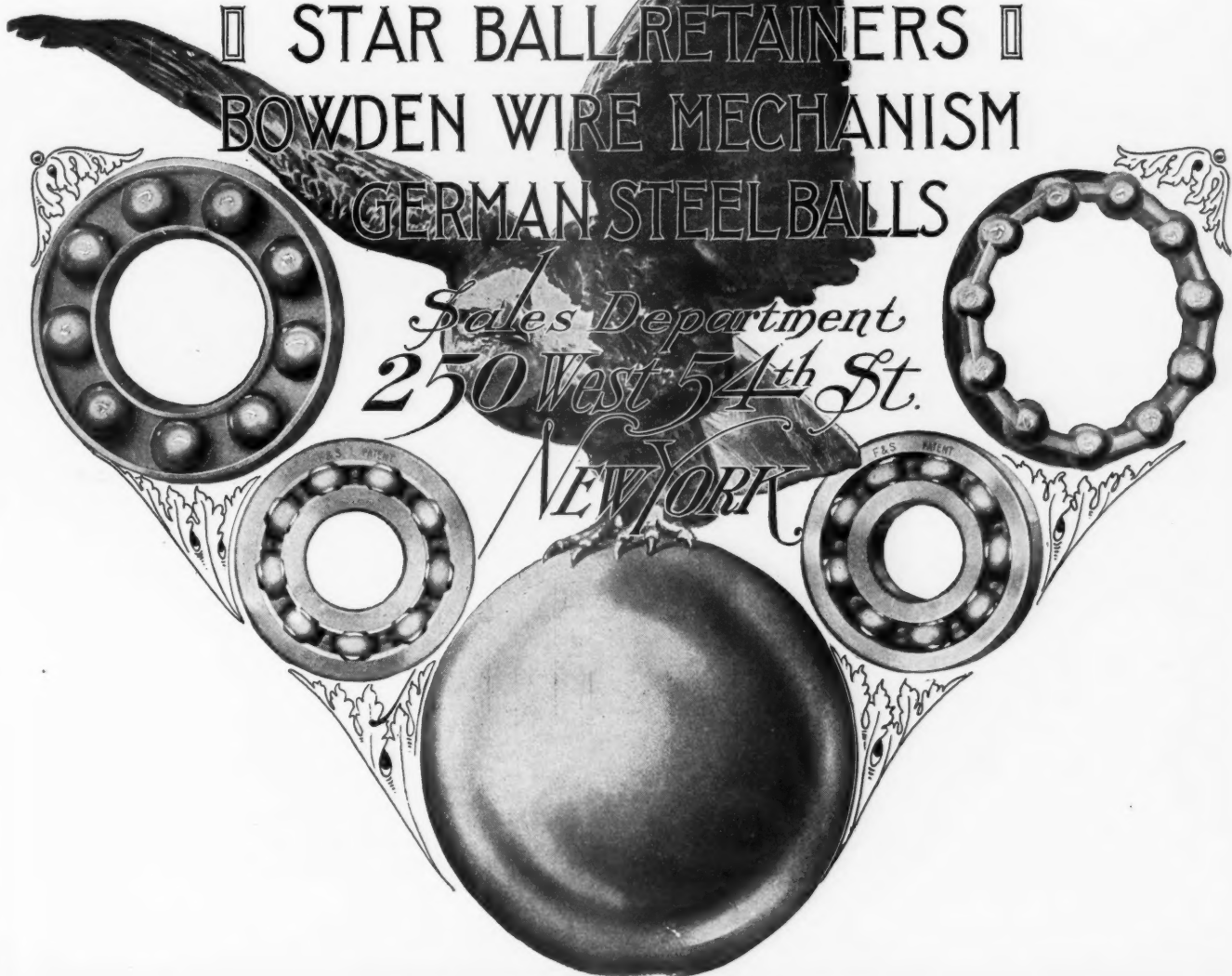
▮ STAR BALL RETAINERS ▮

BOWDEN WIRE MECHANISM

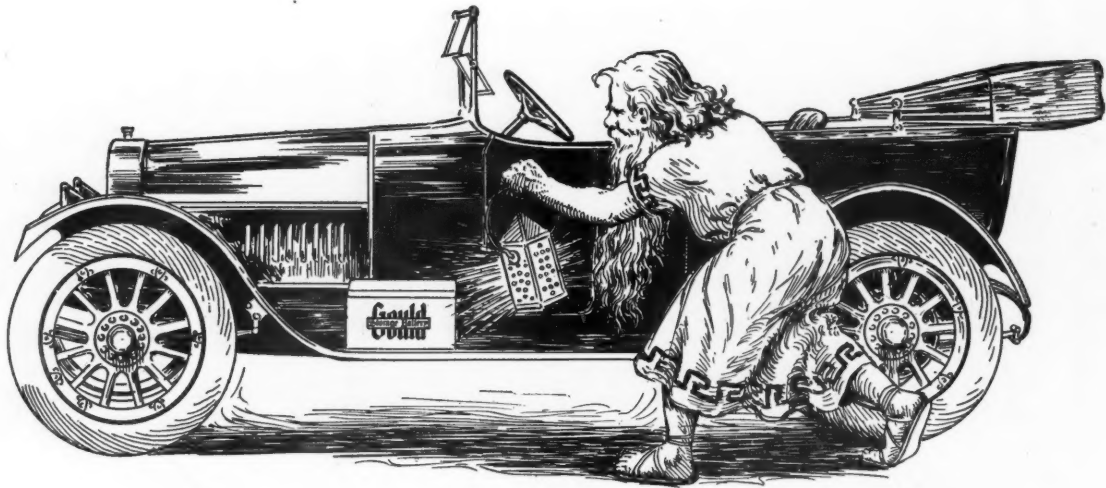
GERMAN STEEL BALLS

Sales Department
250 West 54th St.

NEW YORK



When Writing to Advertisers, Please Mention Motor Age



**"It has a GOULD BATTERY!
that's a good sign"**

—DIOGENES-UP-TO-DATE

A car is known by the equipment it carries.

If Diogenes were alive today and making his selection, the presence of a Gould Battery to assure *reliable* starting and lighting would certainly invite a favorable decision.

Very rugged construction, including hard-paste plates, gives the Gould Battery long life and *lastingly high* electrical output.

Damage from jolting is avoided by heavy case and heavy-walled jars, and leakage is prevented by thorough sealing—acid-tight bushings on the posts, gasketed expansion caps and deeply sealed top plates. Connectors and terminals are not subjected to corrosion, yet there is liberal provision for filling and inspection.

Insisting upon a Gould Battery now would protect you from battery annoyances later.

**Gould
Storage Battery
Gould**

**Gould
Storage Battery
Gould**

Works at
Depew, N.Y.

Gould Storage Battery Co.

Genl. Offices, 30 E. 42nd St., New York

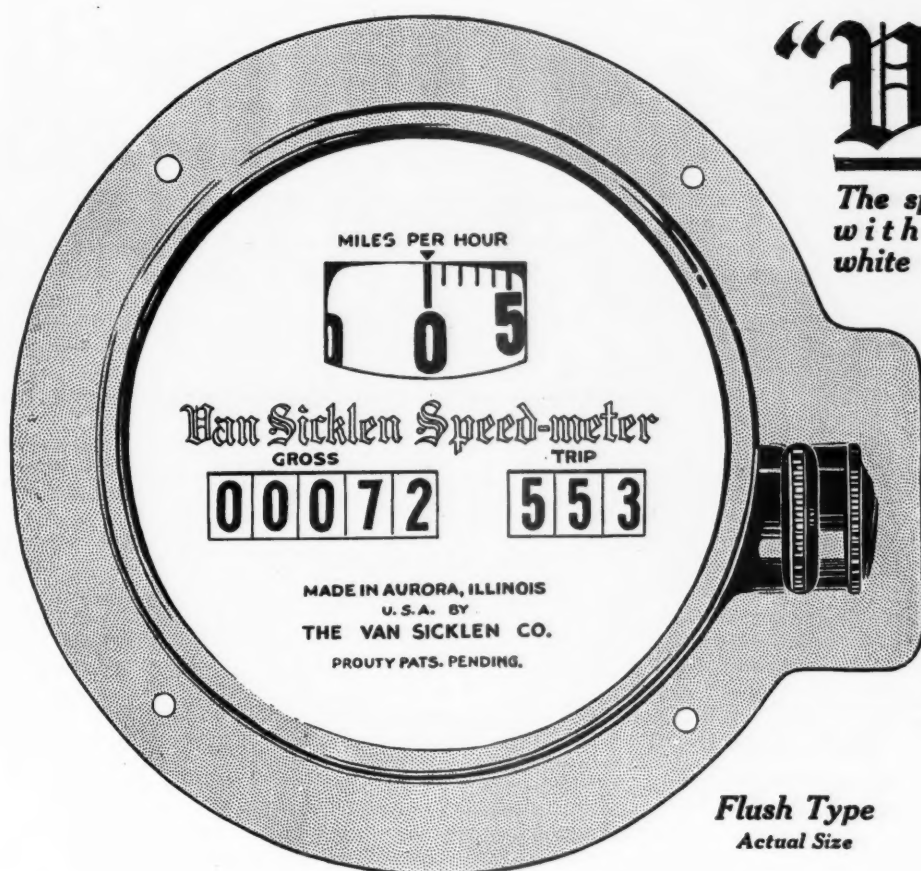
Boston, 347 Newbury St.; Philadelphia, 613 Lincoln Bldg.; Cleveland, 1761-5 E. 18th St.; Detroit, Kerr Bldg.; Chicago, 225 E. 22d St.; San Francisco, 1448 Van Ness Ave.; Los Angeles, 118 E. Pico St.

Agents in Washington, Rochester, Buffalo, Pittsburgh, Milwaukee, Minneapolis, St. Paul, Kansas City, Omaha, Denver, Topeka, Seattle.

CANADIAN REPRESENTATIVE:
R.E.T. Pringle, Toronto, Montreal, Winnipeg, Vancouver.

Full stock of parts, plates and repairs carried by all offices and agents

147



“Van”

*The speed-meter
with the big
white face . . .*

*Flush Type
Actual Size*

MONROE and Van reel off the miles together. The Monroe car gets you there and back. Van keeps count — registers every foot traveled.

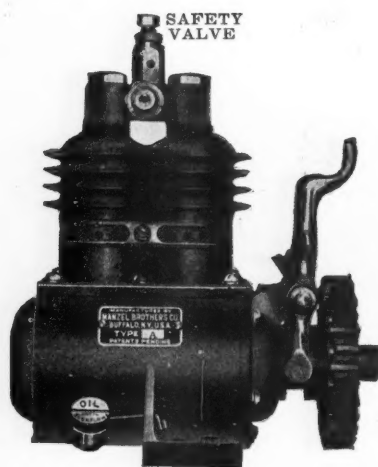
Van *shows* as you go. He's easy to read at any speed.

THE VAN SICKLEN COMPANY
AURORA ILLINOIS

Factory Representatives: Cutting, Armstrong & Smith Sales Co., Detroit, Mich.

General Distributors: The Beckley-Ralston Company, Chicago

MANZEL ENGINE-DRIVEN MANZEL TIRE PUMP



*We Carry in Stock
Fittings for the
following cars:*

Abbott-Detroit, 1912-13-14-15; Buick, 1910-11-12-13-14-15; Cadillac, 1909-10-11-12-13-14-15; Cartecar, R., 1912-13-14-15; Case, 1914; Chandler Six, 1914-15; Chalmers, 1912-14-15; Cole, 1913-14-15; Dodge; E. M. F., 1912; Enger; Franklin, 1914; Grant; Hudson, 1912-13-14-15; Imperial Six, 1914; Jeffery; KisselKar, 1914; Maxwell, 1914-15; Michigan, 1913-14; Mitchell, 1914; Moon; Oakland, 1912-13-14; Oldsmobile, 1915; Overland, 1912-13-14-15; Packard, 1914-15; Paige-Detroit, 1913-14-15; Rambler Cross Country, 1913-14; Reo, 1911-12-13-14-15; Simplex, 1912; Speedwell, 1913-14; Studebaker, 1913-14-15; Stutz, 1914-15; Velie, 1914-15, Westcott and others.

Reliability and Capacity BOTH Are Built Into Every Manzel Pump

You don't have to be persuaded that you need an engine-driven tire pump, Mr. Motorist. All you want is to get the right pump, the one that will do the work for you **unfailingly**. In a word, the pump that you want must have **capacity** and **reliability**.

The Manzel Two-Cylinder Engine-Driven Pump is ideal in both respects. It has the **capacity** to inflate **any** tire, no matter what its size, quickly and completely. It differs in that respect from many other advertised pumps—pumps that pound and gurgle ineffectually in trying to give the last 20 pounds pressure that your tires require. Your pump **must** have **capacity**.

The Manzel Pump is **Reliable**—that kind of reliability that gives you calm confidence and contentment—you are sure when you're equipped with a Manzel that you are ready for any tire emergency. You don't have to worry—you know that its operation is absolutely unyielding, that it will stand up and last longer than your motor and that it's **always** ready for use.

Its design is simplicity itself—simplicity carried out in the most workmanlike way.

The Manzel Two-Cylinder Engine-Driven Pump is the result of 16 years of successful pump manufacturing. It has reached the par of efficiency.

Price **\$20** Complete with all fittings, 15 feet of hose, pressure gauge, etc.

YOUR dealer has it. If not, ask us.

Manzel Brothers Company

*Leaders for 16 Years, in the Manufacture of Quality
Oil Pumps for Heavy Duty Steam and Gas Engines*

Factory and General Sales Offices

306 Babcock St.

BUFFALO, N. Y.

New York Office
U. S. Rubber Bldg., Broadway and 58th St.

San Francisco Office
356 Market St.

Portland (Oregon) Office, 218 Gerlinger Building

DISTRIBUTING CENTERS IN ALL PARTS OF THE UNITED STATES

Special FORD Model complete with 12 feet of hose, gauge and gears **\$7.50**

An always-ready engine-driven tire pump. Install it yourself—no holes to drill—no machine work to do. Once on it's on to stay.

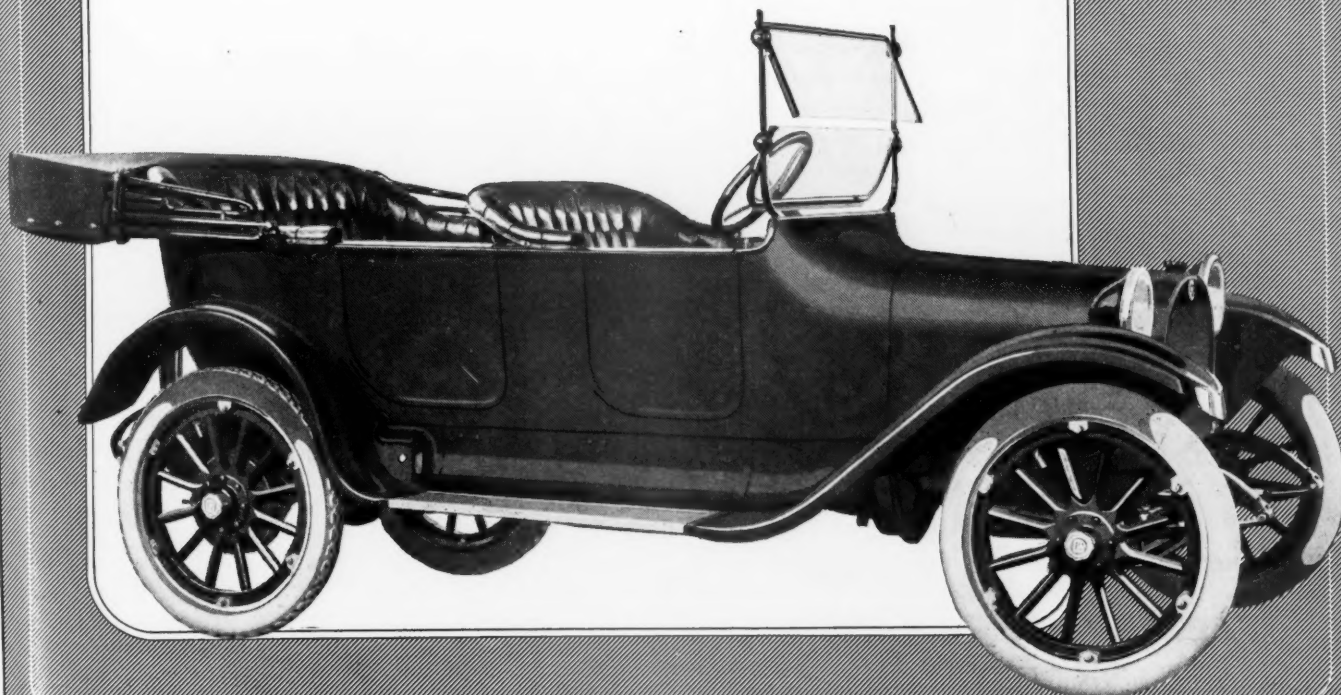
DODGE BROTHERS MOTOR CAR

**Cross-country touring brings no
sense of weariness or fatigue.**

The car's unusual roominess, the depth and softness of the real leather upholstery, the buoyancy of the springs and the design of the seats, together with the quiet running of the powerful motor, make one unmindful of distance.

The wheelbase is 110 inches
The price of the car complete is \$785
(f. o. b. Detroit)
Canadian price \$1100 (add freight from Detroit)

DODGE BROTHERS, DETROIT



OLYMPIC HORNS

\$2⁵⁰

**Lowest
Price**



**Model
B**

Guaranteed

75,000 Olympic Electric Horns Are Standard Equipment

—on leading cars of American make.

And only 10, from this enormous number have been returned for repairs.

Which conclusively proves that the vibrator type OLYMPIC Electric Horn—at \$2.50—while under-selling every other automobile warning signal, outdoes them all for service.

Model B. Under Hood Type.....\$2.50
Model A. Outside Dash Type.....\$3.00

Guaranteed for One Year

Olympic Motor Driven Horn

—operates on the power of 3 to 5 dry cells, or on the storage battery that lights and starts your car.

A sharp, clear warning signal for city use. A penetrating blast in the country.

Backed by replacement guarantee for 1 year, and indefinite warranty.

Get your OLYMPIC today, from your dealer, or direct. Under hood type, Model D, \$5. Outside dash type, Model C, \$6.

Dealers, Jobbers, Manufacturers—OLYMPIC is the warning signal for everyone.

Write for our interesting proposition.



**Model
C**

\$6

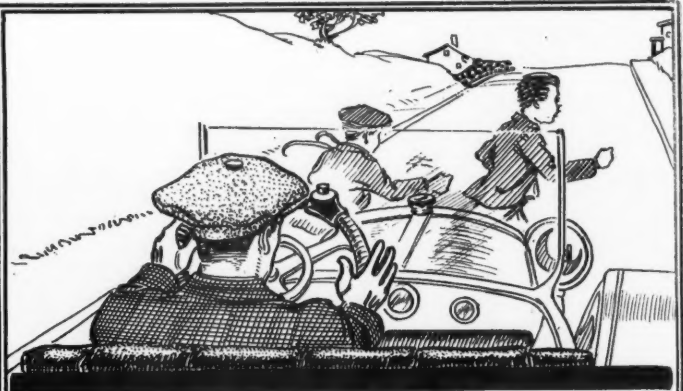
ELECTRIC SPARK APPLIANCE COMPANY
140 Imlay St., Brooklyn, N. Y.

THE F. E. CASTLE COMPANY

Western Distributors

872 Woodward Avenue

Detroit



Button, Button, Where's the Button?

You have experienced those nerve-racking moments when you excitedly chase your horn button all 'round the wheel trying to locate it.

One hand off the wheel—your eyes off the road—and danger staring you in the face!

The feeling of security you enjoy is worth many times the cost of—

THE SENG SWITCH

"Safety At Your Finger Tips"

The SENG Switch permits the use of both hands in driving. It gives you complete control over your automobile horn—at all times. No more necessity for fumbling for a push-button. Without changing the position of your hands you can operate your horn from any part of the steering wheel. One finger turns the trick!

The SENG Switch is conceded by leading automobile authorities to be the safest method of horn operation. Protect yourself! One accident averted through absolute and instantaneous control over your warning signal will pay many times over for this little device.

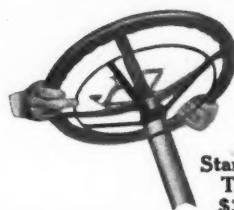
STANDARD MODEL, price \$3 complete, ready to put right on your car.
FORD SPECIAL MODEL, \$2.50 complete.

At your dealer's, or sent postpaid on receipt of price. Dealers and jobbers wanted.

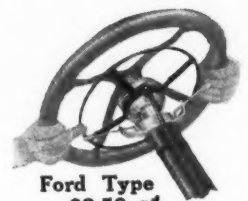
W. P. SENG

1450 Dayton Street,

Chicago



**Standard
Type
\$3.00**



**Ford Type
\$2.50**

CARRY AN EXTRA TIRE IN YOUR TOOL BOX

With *Dobbins Blow-Out Chains* aboard, it's the same as always having an extra tire in your tool box. When your last spare tire "goes bang," you don't have to run on the rims or wait on the road for a new shoe. You quickly and securely hold the blow-out with this wonderful device—

DOBBINS BLOW-OUT CHAINS

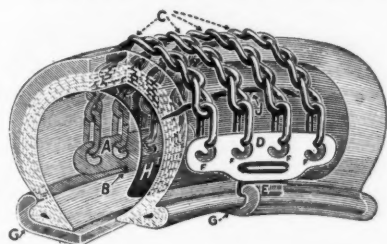
They reinforce the shoe and hold the worst blow-out so securely that it becomes the strongest part of the tire.

Given the severest tests—500-mile runs with the worst sort of blow-outs—over rocks, through deep sand, mud and snow—Dobbins Blow-Out Chains always "make good." They securely held a very bad blown-out tire on a car that was stalled in a river bed partly made up of quicksand, and a careful examination failed to reveal a particle of sand or moisture between the shoe and the inner tube.

These tests proved that Dobbins Blow-Out Chains actually "sand and water proof" the compartment between the patch and the tube, and places the device in a class by itself.

Dobbins Blow-Out Chains are made in two styles: For Clincher and Straight-Side Tires. With each Chain is packed an inner patch that is to be placed directly over the hole or cut, on the inside of the shoe, with the sticky side next to the casing. Full directions packed with each chain. They are easily attached.

Sectional view of Dobbins Blow-Out Chain in place



- | | |
|--------------------------|--|
| A—Main Plate | F—Curved Slots permitting adjustment for due amount of tension |
| B—Bent Lip on Main Plate | G—Rim of wheel |
| C—Cross Chains | H—Inner Patch placed inside of shoe |
| D—Second Plate | J—Blow-out |
| E—Auxiliary Hook | |

Price List of Dobbins Blow-Out Chains (Including Inner Patch)

\$1.00	each	for	3-inch	and	3½-inch	tires.
1.50	"	"	4 "	"	4½ "	"
1.75	"	"	5, 5½ "	"	6 "	"

Manufactured by

Weed Chain Tire Grip Co.
Bridgeport, Conn.

Manufacturers of the famous Weed Anti-Skid Chains

When Writing to Advertisers, Please Mention Motor Age

PERFECTION PISTON RINGS

These Piston Rings Actually Save Both Power and Money



First Operation

Perfection Piston Rings are different from all others both in their method of construction and in the results they achieve.

They absolutely prevent loss of compression, thus enabling the motor to give maximum power. Ordinary piston rings leak, causing a loss of power, which is saved by using PERFECTION RINGS.

They save money, because less gasoline and oil is required, because less carbon is formed, as the oil cannot work into the combustion chamber; because there are not so many repair bills.

In short they produce better results at less cost—a condition which makes them desirable for any car.

PERFECTION PISTON RINGS consist of special soft elastic steel 1/16" wide. These are so made that there is an equal spring tension at all points, so that there is perfect bearing on the cylinder walls.



Second Operation

The opening in the various sections coming at different points cause the ring to always present a barrier to the gas in the combustion chamber, so that it cannot escape through the rings, as is the case with one-piece rings.

Note the illustrations. They show how easily PERFECTION RINGS are applied. They are not stretched, distorted or broken. There is also much less friction than with cast-iron rings. Any size ring can be made with these 1/16" sections, making it unnecessary to carry large stock.

There is a big field for PERFECTION RINGS and energetic dealers will find them mighty profitable to sell. Write for our prices and discounts.

SOLE DISTRIBUTORS

Automobile Construction & Engineering Company
3328 Ludlow St., Philadelphia, Pa.

SUB-DISTRIBUTORS

N. A. PETRY CO., Inc., 1309 Race St., Philadelphia., Agents for Penna. and Atlantic Coast States, South.

A. H. COATES, 442 Market St., San Francisco, Cal., Western Representative for North and South: West of Denver.



Third Operation

Just as Good as the Highest Priced

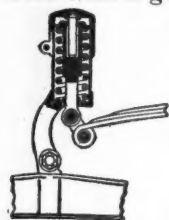
A SET OF 4 FORD "O-G" SHOCK ABSORBERS FOR ONLY \$9

"O-G" Shock Absorbers are easily worth twice what they cost, but the tremendous facilities for quantity production have made possible this low price.

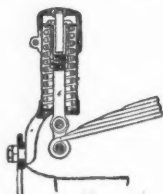
"O-G" Shock Absorbers can easily be attached by Ford owners themselves in 15 minutes.

Adjustable when placed on cars and automatically adjusted in service.

Sold with a guarantee that covers workmanship, material, finish and satisfactory service during the use of the car.



Mail us a check and we will send you a set with instructions for attaching, or write us at once for particulars.



Complete Generating and Decarbonizing Outfit for \$15.00

Sold with complete equipment, extremely economical to operate and guaranteed in every particular.

A generator not too large for a small garage or shop, but with capacity great enough for the largest.

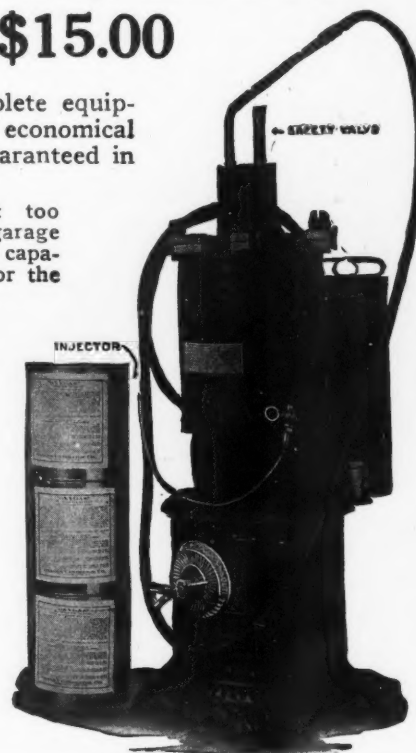
No tanks to bother with, no delay in securing material. A practical equipment that can be operated by any one.

Carbon can be removed from any cylinder in three minutes.

Oxygen can be generated in three minutes.

It is a time, money and labor saver.

Write today for particulars



OXYGEN GENERATOR CO., Inc.
301 RIVER STREET TROY, N. Y.



Pride

PRIDE is the mirrored image of self-respect; a self-compliment reflecting judgment, achievement, or possession.

Pride-value is become a sound basis of judgment in any purchase, and an item of large consequence in the choice of a motor vehicle.

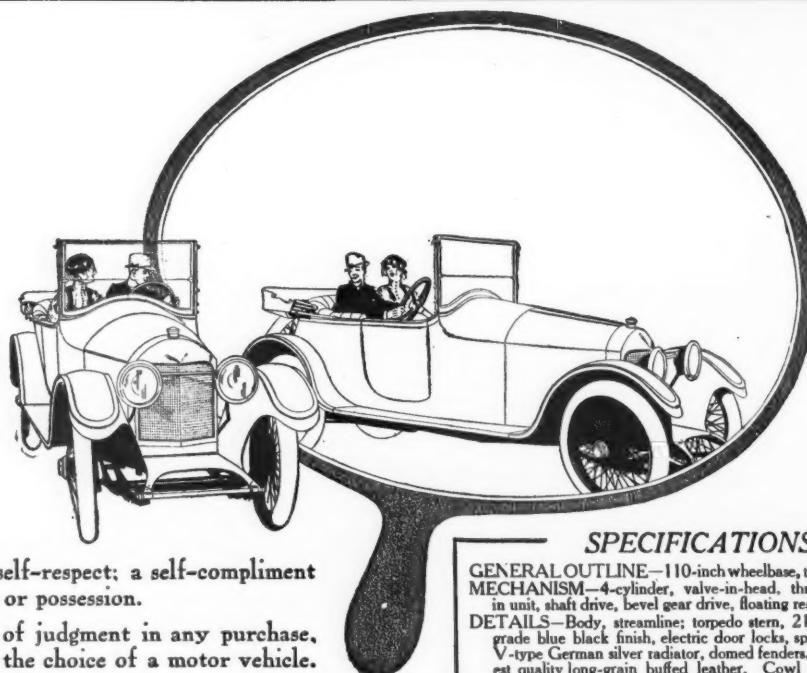
Scripps-Booth

Scripps-Booth luxurious light cars for the first time offer pride-value in minimum weight together with the most advanced construction and complete appointment of any motor car of today.

Art and psychology in these designs blend with engineering and factory processes to produce the world's highest achievement in motor cars of the maximum-luxury type, giving to Scripps-Booth cars as to no others, that priceless attribute of self-respect, which the man reflects as Pride.

SCRIPPS-BOOTH COMPANY, DETROIT, MICH.

When Writing to Advertisers, Please Mention Motor Age



SPECIFICATIONS

GENERAL OUTLINE—110-inch wheelbase, three-passenger car. MECHANISM—4-cylinder, valve-in-head, three-speed gear-set in unit, shaft drive, bevel gear drive, floating rear axle.

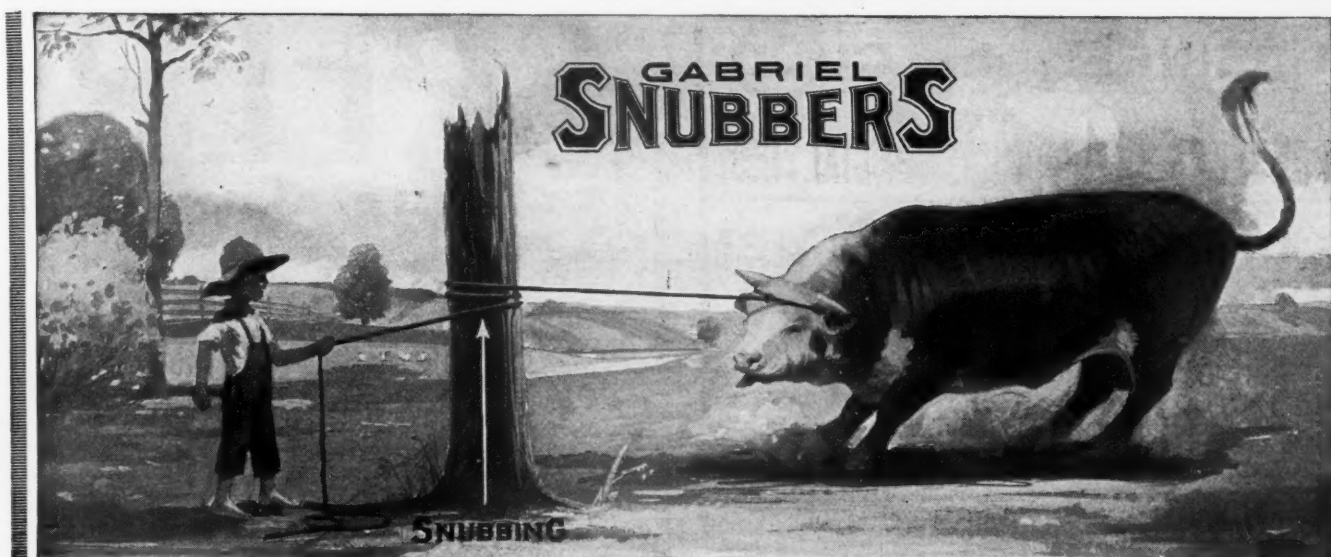
DETAILS—Body, streamline; torpedo stern, 21-in. door, highest grade blue black finish, electric door locks, spare wheel carrier, V-type German silver radiator, domed fenders. Upholstery, finest quality long-grain buffed leather. Cowl dash instruments; sight feed oiler, lighting and dimming switches, starting strangler, starting and ignition switch, flush type speedometer, generator indicator, shroud light and foot space light.

WHEELS—Five Houk, triple laced, detachable wire, 30x3½ inch, wide hubs.

STARTING—Bijur single unit electric nonstall, connected by silent chain and operated by locking dash switch.

EQUIPMENT—Silk mohair top with side curtains, rain vision plate glass wind-shield, electric door lock, Klaxet horn, full tool equipment, luggage space at the rear large enough for two suit cases and tools. Spare Houk wheel and tire on all cars. Zenith carburetor.

FEATURES—Klaxet button in center of steering wheel cannot be operated when ignition switch is off. No projecting handles or slots in the doors. Electric door locks are operated by pressing a small push button. Running boards and floor covered with cork linoleum of high grade. All instruments nickel plated.

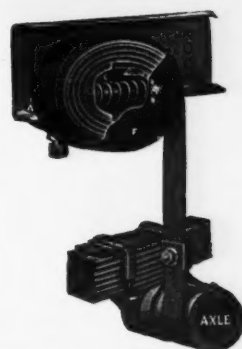


"It's All in the Coil"

It's the coil of rope around the tree that holds the bull. The harder he pulls, the tighter the rope coils and the greater is the resulting friction.

It's the same way in driving your car equipped with Snubbers. The bigger the bumps, the tighter the layers of belting will coil around the center spring, and the greater will be the *frictional resistance against rebound* of springs and car body. Snubbers *automatically* exert just the right amount of resistance against spring rebound, to ensure practically the same easy riding on *rough* roads as on *smooth* roads. *Do you get that? Write for Booklet.*

GABRIEL HORN MFG. CO., 1415 E. 40th St., Cleveland, Ohio.



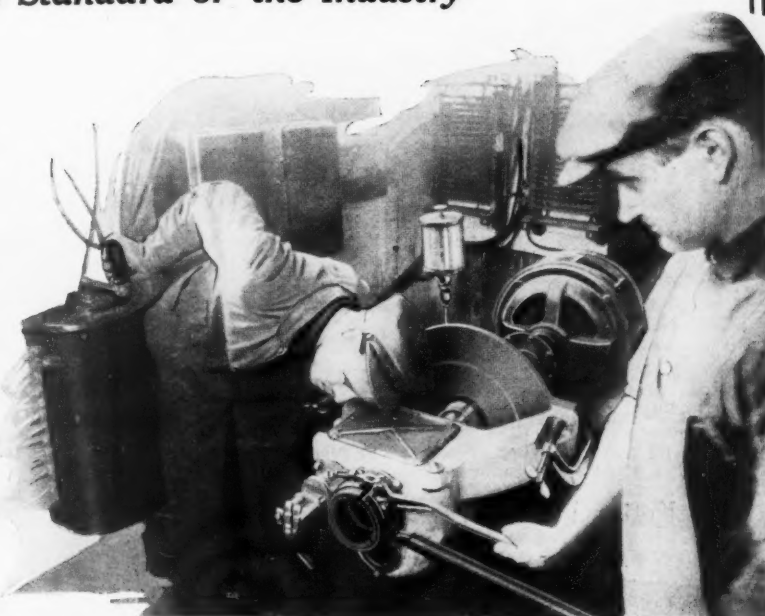
Warner Gear Company Transmissions

"The Recognized Standard of the Industry"

In sound-proof rooms the final "O K" by experts who do nothing but test transmissions for quietness, is the car builder's absolute assurance of highest quality.

**Warner Gear Co.
Muncie, Indiana**

DETROIT OFFICE 967 WOODWARD AVE.



When Writing to Advertisers, Please Mention Motor Age

BUSINESS IS GOOD

FOR ALL SELLING

PEERLESS AUTOMOBILE SPECIALTIES

Make Old Cars Look Like New

PEERLESS MOHAIR TOP DRESSING—For Waterproofing and renewing old tops.

PEERLESS LEATHER TOP DRESSING—For softening and renewing rubber, leather and pantasote tops.

PEERLESS LINING DYE—For dyeing faded waterstained and grease spotted linings, a black uniform color.

PEERLESS CUSHION DRESSING—For brightening and renewing the finish on leather cushions.

PEERLESS LAMP ENAMEL GLOSS—For making a rich gloss finish, with one coat covering solid.

PEERLESS LAMP ENAMEL DULL—For making a rich dull finish, with one coat covering solid.

PEERLESS MIRROROID—For a new varnish finish on dull automobile paint. Apply with a cloth. Dry in five hours.

PEERLESS CYLINDER ENAMEL—Black or Gray colors as desired. Wears indefinitely.

PEERLESS JET BLACK FENDER JAPAN—For finishing fenders with a rich, high gloss enamel.

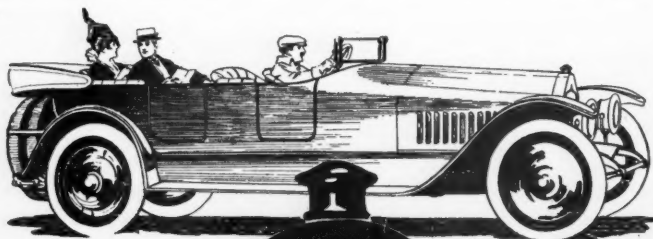
PEERLESS AUTO BODY POLISH—Polish that we recommend for varnishing surfaces.

PEERLESS RIM PAINT—One coat keeps tires from sticking and rims from rusting.

PEERLESS EXTRA FINE BLACK JAPAN—A solid covering gloss enamel for all around work.

Sold principally by Auto Supply Jobbers, Dealers, Garages and Hardware Stores. Used by Auto Painters.

THE COLUMBUS VARNISH COMPANY
Makers COLUMBUS, OHIO



National

All's Well Behind this Radiator!

THIS distinctive radiator is a time-honored guarantee that "all's well" with the car behind it. In the world's fiercest contests it has been this distinct radiator, sighted far down the track, that has so often heralded another National victory.

When the man on the curb sees this radiator on your car, he credits you not only with good taste, but with sound judgment, for the beauty of the National's performance is as superior as its beauty of appearance. Fifteen successful years of car building warrants your confidence in the National. The National owner knows his car is full value at \$2375.

National Motor Vehicle Co., Indianapolis

SPEER

Metallic Brushes

—are manufactured under the most favorable conditions, in the most modern and best equipped factory of its kind. Evidence of these surroundings is predominant in the quality of SPEER Metallic Brushes.

Manufacturers—Dealers

Service is the biggest selling point of the day. The demand is for goods that do their work—and last. SPEER Metallic Brushes sell for service—and they give absolute satisfaction. Write for discounts.

SPEER CARBON COMPANY
SAINT MARYS, PENNSYLVANIA

ENGINE REDUCED SALE ENGINE PRICES FOR QUICK SALE

BRAND NEW STOCK MODELS

Carrying our regular guarantee

will be SACRIFICED to save moving from our
Peru, Indiana, factory to our new
plant at Pittsburgh

SINGLE ENGINES OR QUANTITY

MOTORS ONLY OR UNIT

POWER PLANTS

4 CYL.—4 CYCLE

3½x4½

4x5

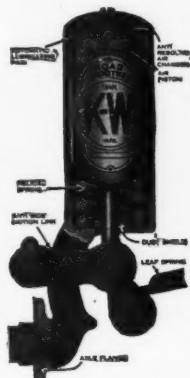
4½x5½

5x6

ENGINE SALE

WRITE OR WIRE
Pittsburgh Model Engine Co.

HOMewood STATION
PITTSBURGH, PA.



Road Smoothers

Quickly applied to your Ford Car

take the Kicks and Worry out of the road. They give you big, heavy car comfort in your light, economical Ford by combining these three essential features;

a spring to effectively take up the shock; an anti-rebound air chamber to rebound of the spring, and anti-side motion links to prevent rocking and swaying.

You can get all of these essential features only in K-W Road Smoothers, which are backed by a guarantee that covers not only workmanship and material, but results as well.

There is only one "Road Smoother" and that is the K-W. Sold by reliable dealers everywhere. Write for illustrated booklet "That Satisfied Feeling."

\$15 Set of Four
One for Each Wheel



2835 CHESTER AVE.

CLEVELAND, OHIO, U.S.A.

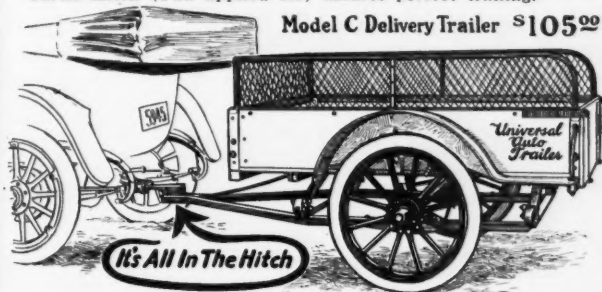
Manufacturers of the 125,000 K-W Master Vibrators

500

Universal Auto Trailers Sold By One Distributer In 90 Days

WITH practically no publicity and selling expense of less than \$150.00, Alex. R. Curtis, at Minneapolis, sold 500 of these trailers through the recommendations of purchasers. For many uses. Capacity 1,000 pounds.

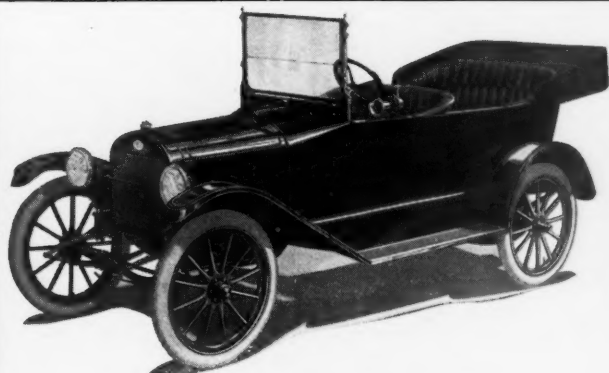
Built for road use and abuse at automobile speeds. The Curtis Hitch (Pat. applied for) assures perfect trailing.



Model C Delivery Trailer \$105.00

Write for Descriptive Circulars and Dealers' and Distributors' Selling Proposition.

UNIVERSAL TRAILER CO., Chicago, Ill.



METZ '25'

The Quality Car

\$600 Equipped Complete

Including

Gray & Davis Electric Starter and Electric Lights

This new Metz Touring Model is a man's car, every inch of it; but it pleases the ladies, too. It has the impressive style and the luxurious finish which they so much admire, and is so simple in operation that they can safely drive it.

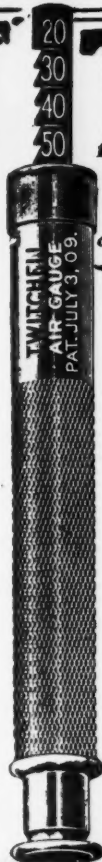
In addition to electric system, equipment includes rain-vision wind shield, instant one-man top, heavy tufted upholstery, deep cushions, 32" wheels, 3 1/2" Goodrich clincher tires, Bosch magneto, Hyatt roller bearings, built-in gasoline gauge, speedometer, signal horn, tools, etc., and fibre grip gearless transmission—which eliminates all clutch and gear trouble.

We want to hear from Dealers
Write for particulars and New Catalog "K"

METZ COMPANY, WALTHAM, MASS.

Twitchell Air Gauge

The New Positive Lock Stop



feature renders absolutely impossible the registration of any but the exact pressure in your tires.

Don't Guess

Tires inflated to forty pounds look and feel exactly like tires containing eighty. The only way to tell the exact air pressure in your tires is by means of a TWITCHELL gauge.

Price One Dollar

For Sale by Jobbers, Dealers and Garages, or

THE TWITCHELL GAUGE CO.
1201 MICHIGAN AVE., CHICAGO

The Best Horn \$3.50 On the Market Only



**Best Quality
Best Tone**


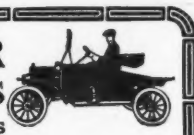
Plunger operates straight down—the natural way. Full grown projector and bell. The only horn—

**Guaranteed For
3 Whole Years**

—on money-back basis. Our \$3.50 horn is the best value, built up to a 3-year guarantee. Order yours today.

**DEALERS—Big Discounts.
Write.**



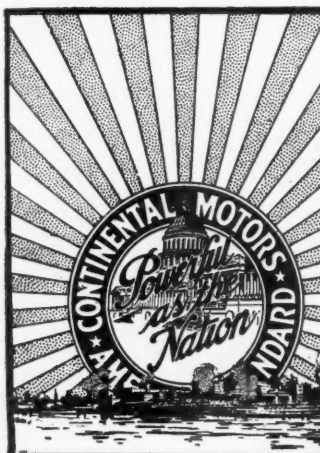
Service Motor Supply Co.
Washington Blvd. and Des Plaines St., Chicago

BOSTONSTARTER For FORD CARS

Fully Guaranteed. Does the work. Cost—a fraction of electric starting cost. No harm to car; does not interfere with cranking in usual manner. Releases in case of backfire. Retards spark automatically before starting. Time tried success—no experiment. Be sure you get the **BOSTON STARTER**. Ask the Ford dealer or your dealer or write.

Boston Starter, Boston Mass.

Continental Motors
Uniformity
Prestige
Experience
Stamina

Continental Motors Mfg. Co.
DETROIT, MICHIGAN



BROWN Jr. Tire Pump

**NEW PRICE With Gauge
and "T," \$5.50**

Built like a motor with lapped rings. A high grade pump at a small price for medium size tires. You cannot afford to run your car without this pump.

**SEND FOR LEAFLET—
JUST OFF THE PRESS**

**The Brown Co., 129 Bellevue Ave.
Syracuse, N. Y.**

Make Sure of Your Lights

—and your starting motor. Don't take chances of their failing unexpectedly. A

Weston

Model 354 Ammeter on Your Dashboard or Cowl

will keep you posted every minute regarding electrical conditions. Its exact information is invaluable—the cheapest and best insurance you could buy.

Weston instruments are built with a full knowledge of the exacting requirements of Automobile service. Write for full information.

WESTON ELECTRICAL INSTRUMENT CO.,
10 Weston Avenue Newark, N. J.
BRANCHES IN THE LARGER CITIES



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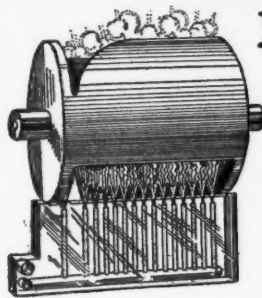
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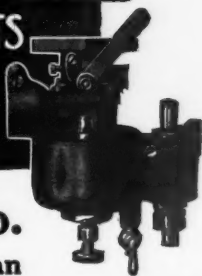
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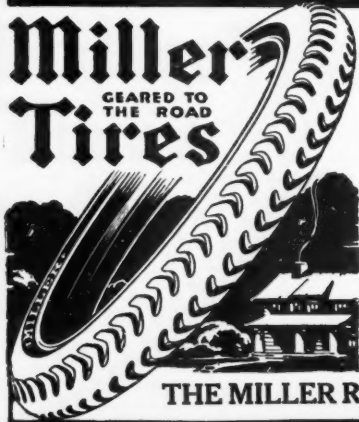
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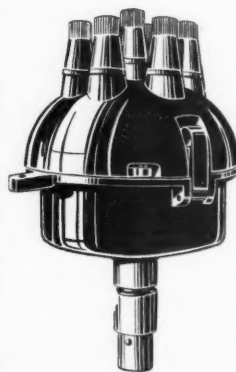


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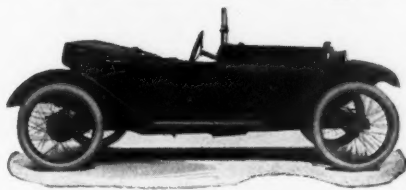
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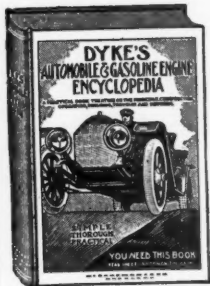
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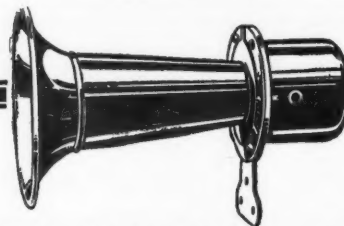
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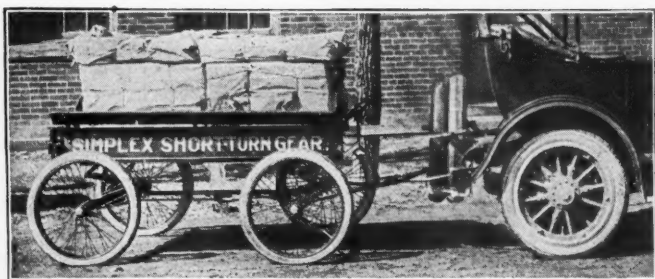
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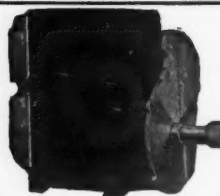
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1915

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Must Close Out Balance At Once.

New 4x5 40 H. P. motors, cone clutch, equipped for Westinghouse starter...\$110.00
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3/4 scroll springs, 2x49 1/2; pair..... 7.00
Spicer universal joints, 1 1/2 sq. both ends. 6.00
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Ford dem. Detroit wheels, set..... 16.00
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We announce a reduction of from \$20.00 to \$14.00 on our Spare Demountable Wheels for the Ford. We have some good territory left. Why not handle an original line? Carry extra wheel with tire on ready and interchangeable with any of present wheels. Can install outfit at home, then change wheels in less than two minutes. Write for catalogue. Legitimate dealers, get our agency for Spare Wheels, Spring Radius Rods, Fan Belts, Radiators, Cradles, etc. **"ANGIER'S," Dept. B, Streater, Ill., U. S. A.**

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Motor Car Parts and Service

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Write for prices on parts needed in connection with American cars.

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From the

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Buick 10, E. M. F., Flanders, Winton, Overland, and Regal 30. Parts a Specialty.

Motor parts and accessories for almost any make of car.

Write Us Your Needs

Another Orphan Protected By Us

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The Clearing House—continued.

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All sizes and makes in stock ready for immediate delivery—At prices that will interest you.

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Model 79 Overland touring bodies complete with top and wind shield.

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75 Spacke De Luxe Motors.....	Each	\$75.00
Atwater-Kent Unisparker fitted to motor		10.00
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"Will out-live your car"

All radiating surfaces—no fins—one of the most efficient coolers made. Very strong and handsome. Built in any size or design. New cores put in any radiator. Also Repairing. Absolute satisfaction guaranteed.

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Equipped with F. & H. Special Wire Wheel Rims. Adaptable to any car. Complete equipment for Ford cars.

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Commercial bodies guaranteed to fit Model "T" Ford. Bucket seats not painted or trimmed, \$5.00 per pair. Trimmed and upholstered backs and cushions, \$15.00 per pair. We also build a full line of Speedster bodies complete; also Ambulance and Undertakers' cars, all for Ford chassis. Send for our catalog. Agents wanted everywhere.

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We have the only practical Bus Body on the market. Our price is a revelation. Get full particulars.

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Made for all old cars without the doors. We have all patterns. Just give us the name of your car.

CHICAGO AUTO BODY CO.. Chicago, Ill.

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New 5x8 four-cylinder, governor-controlled engine, fully equipped, with carburetor, magneto. Will sell for much less than cost. **FRED HANSON**, 570 Prior Ave., St. Paul, Minn.

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Pinion (chrome nickel steel).....\$1.00
Differential ring or master.....3.00

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For Any Ford Chassis

Write for prices and catalogue. Special Bodies for any chassis built to order.

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Krit Roadster bodies upholstered and repainted.....\$35.00

Krit 5-Passenger bodies upholstered and painted; will also fit a Ford 48.00

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SPECIAL ONLY FOR THIS WEEK

Shaft drive rear axle, complete with front axle, set of 4 wire wheels.....	Outfit	25.00
Krit Radiators.....	Each	15.00
Mufflers	Each	1.50
Stromberg Carburetors 1 1/4".....	Each	11.00
Gasoline Tanks, 10x30 round.....	Each	4.00
Gasoline Tanks, 20x13x8.....	Each	2.00
Trunks, 30x14x18.....	Each	6.00
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Where the lustre has died out. Peerless Mirroroid leaves a rich, full lustre on varnished surfaces; dry in four to five hours. Ask your dealer.

THE COLUMBUS VARNISH CO.
Columbus, Ohio

Lozier Repair Parts

We have on hand repair parts for Lozier Cars at reduced prices. Send old parts for replacement.

Philadelphia Machine Works
67-71 Laurel St., Philadelphia

The Clearing House—continued—

K R I T Will Be Continued

The recent auction sale at the Krit plant was for the purpose of disposing of all obsolete material and surplus production stock. No items of any kind were sold that will be needed by us in maintaining the Service Department for Krit dealers and owners.

The Service Department will be continued on a better, and more satisfactory basis than ever before. The auction sale in no way affects the continuation of the business of the Service Department.

The Krit Motor Car Company is here to stay and you may absolutely depend upon getting prompt and accurate shipment of all parts just as long as there is a Krit car running.

Address all mail the same as always—to the Krit Motor Car Company, Detroit, Michigan.

Krit Motor Car Company Detroit, Michigan

MAXWELL OWNERS AND REPAIRMEN

Why pay 20% advance for your repair parts for the old models of MAXWELL cars? We can supply 90% of your wants at the old list price. Transmission gears and parts in stock for Cadillac, Case, Croxon, Dorris, Elmore, Moline, Moyer, Overland, Regal, Selden, Stoddard, Velle and 75 others at cut prices. Why pay more? Send for price list.

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MORE SPEED FOR THE FORD

Special Ratio Differential Ring Gear and Drive Pinion for the Ford. Either 2 4/7 to 1 or 3 to 1 ratio.

More speed with maximum power at a decreased cost in gasoline and oil consumption is the result obtained by using either of these ratios, because they prevent the "racing of the motor" which is necessary with the regular Ford ratio (3.63-1) to make time.

EITHER RATIO \$15.00 PER SET

We also furnish a 4-1 ratio for use on Ford light delivery cars or for very hilly or heavy sand country travel.

Detroit Radiator & Specialty Co.
963 Woodward Ave. Detroit, Mich.

NEW DESIGN RACING SEATS

Write for Catalogue

CHICAGO AUTO EQUIPMENT CO.
319 So. Jefferson St. CHICAGO

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Bring your car up to date. Write for our Bulletins. They will show you how to save \$\$

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Ford "V" shape, honeycomb.....	\$23.50
Ford straight front honeycomb.....	18.50
Chevrolet "V" shape, 6 cyl.....	20.50
Oakland "V" shape, nickel finish.....	22.00
Hupp "20" honeycomb.....	25.00
Buicks—all models	

TOPS

Ford touring car, complete with curtains and top boot.....	16.00
Ford roadster tops, complete.....	12.00
Maxwell "25" less curtains.....	6.00

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New wheels with demountable rims for all cars.	
New Wheels with demountable rims for Ford and Maxwell cars, complete with extra rim, per set.....	18.00
We allow \$1.00 each for old wheels.	
34x4 and 4 1/2 Q. D. wheels.....	2.00
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30x3 New Ford wheels.....	1.50
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18" Steering wheels with aluminum spider.....	2.50
16" Steering wheels.....	1.50
1" Kingston carburetors for Fords.....	2.50
1" Marvel carburetors.....	3.00
1" Holly carburetors complete with hot air pipe and stove.....	3.00
1 1/4" Model "L" Schebler carburetors.....	11.00
Guaranteed spark plugs, 12 for.....	1.50
2 1/2" Spring clips, per dozen.....	.50
30x3 New (guaranteed firsts) clincher casings.....	7.00

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Set of four, enameled black.....	12.00
----------------------------------	-------

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Ring gear.....	3.75
Pinion.....	1.25
\$35.00 type shock absorbers for heavy car	10.00
Ford Shock absorbers.....	4.50

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Remove carbon with The Cowdin Carbon Remover, price 65c. We also manufacture and guarantee the Leak-No-More Radiator Compound which prevents Radiators from leaking, price 60c. From your dealer, or we will ship prepaid on receipt of price.

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NEW 1915 FORD ROADSTER BODIES

These bodies include new cowl, top, cushions, side curtains, slip cover, floor boards, rubber mat, dash and hood support, windshield, rear round fenders and irons, 2 side lamps and tail lamp. Complete \$65.00 f. o. b. Detroit, crated. Fit any Ford chassis from 1912 up.

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One coat of Peerless Rim Paint keeps the rims free from rust and allows the tires to be removed with ease. Ask your dealer.

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Columbus, Ohio

ONE MINUTE FORD TIRE TOOL

This tool will positively completely change a Ford clincher tire in one minute without labor. Postpaid for \$1.00. Dealers, send for circular and dozen price.

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Save \$25 to \$75 by doing the work at home with the Arsenal system. Our big free booklet, "The Car Beautiful," tells how. Send for it today.

Arsenal Varnish Company
Auto Dept. Rock Island, Ill.

Prest-O-Lite Gas Tanks B, \$10.50, Black and Nickel Windshields, \$6; Ford Gas and Electric Head Lamps, \$3.25 pair; Spark Plugs, \$0.25. One-third with orders.

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RACING BODIES AND SEATS

for all chassis—guaranteed to fit.

Fenders, Hoods, Tanks, Radiators

STANDARD AUTO SHEET METAL WORKS
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Ford Model T Tubular.....	\$16.00
Ford Model T Honeycomb, V-shaped.....	25.00
Buick 16 and 17.....	25.50
Buick 10.....	20.00
Hudson 20, 32 and 33.....	28.50
Chalmers 20.....	30.00
Everett 30 Tubular.....	14.00

Write for prices on any other makes

AUTOMOBILE APPLIANCE CO.
1436-38 S. Michigan Ave., Chicago, Ill.

Radiator Bargain

in Studebaker Radiators

We have a quantity of radiators for Studebaker cars on hand, and offer them for immediate sale at an exceptionally low cash price.

Every one is a new Fin and Tube radiator, guaranteed to fit.

Studebaker 35.....	\$23.50
E. M. F. 30.....	23.50
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Send in your check now—They won't last long

Detroit Radiator & Specialty Co.
963 Woodward Ave. Detroit, Mich.

The Clearing House—continued.

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NEW GUARANTEED

	Tubular.	Honeycomb.
Ford T.....	\$17.00	\$19.50
Buick 10.....	19.75	22.50
Hudsons, 20-33.....	29.00	29.00
Overlands.....	\$1.00	\$3.00

We have radiators, both tubular and honeycomb, to fit any car. Write us for prices before buying. Send in your old radiator for repairs. We are experts. We'll make allowances on your old radiator.

WORLD'S LARGEST DEALERS

In automobiles and accessories. Send for the great

PRICE WRECKER

the money saver, covering everything pertaining to an auto.

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AUTO PARTS COMPANY

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ROBE RAILS 75 CENTS

A leather covered sable robe rail; detachable ends; no more stuffing robe or coat. Dealers' discount. Write to

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Write for Descriptive Catalogue and Samples

WISCONSIN AUTO TOP CO.
Dept. 5, Racine, Wis.

SHIP THAT TROUBLESOME CARBURETOR by Parcel Post. We rebuild and install new parts. Factory testing methods used. Service Station for Rayfield, Schebler, Stromberg and Holley. All work guaranteed. Wills, Carburetor Specialist, 358-360 Belleville Ave., Newark, N. J.

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Saves Gasoline and Oil-Increased Compression. Used in all Engines—Write for circular. W. V. SMITH, Sole Manufacturer and Patentee, 421 Ave. A, Schenectady, N. Y.

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10,000 storage tanks, 50-10,000 gallons capacity. 7,500 tool kits for Fords and larger cars. Lathes, Drill Presses and all other small and large machine tools. Equipment of every kind for garage owners and repair men. Write for complete list of snaps. No. MB-146.

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Owners Chicago House Wrecking Company
35th & Iron Streets Chicago

Sun, Rain, Snow and Sleet Eat Out the Life

Or oil, causing decay in leather, rubber and pantasote tops. Peerless Leather Top Dressing is an oil preparation which adds new life to old tops. Ask your dealer.

THE COLUMBUS VARNISH CO.
Columbus, Ohio

SPEEDOMETER REPAIR CO.
Parts Repaired and Furnished
The ONLY Known Concern Repairing Broken
Speedometer Shafts; any make repaired.
1303 W. Jackson Blvd., Chicago, Ill.

STARTLING AUTO

AND

AUTO ACCESSORIES REDUCTIONS

THE DEMAND FOR A HIGH GRADE AUTOMOBILE AT A MODERATE PRICE IS GREATER THAN EVER. OUR POSITION IN THE AUTOMOBILE INDUSTRY IS SUCH THAT WE ARE ABLE TO SELL AT ALL TIMES LOWER THAN ANYWHERE ELSE.

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SEE THE 250 CARS ON OUR FLOORS BEFORE DECIDING

New 5 pass. touring cars, electric light and self-starter, fully equipped; reg. price, \$1,500; our price, \$810. New 5 and 7 pass. touring, fully equipped; list price, \$1,750; special job, \$545. NEW KING ROADSTERS; regular price, \$1,500; our price, \$690. New Sampson delivery trucks, with express body, \$495.

Our new catalog, "Price Wrecker" just off the press. Contains 3,000 Money Saving Bargains, with a special department devoted to Ford accessories and equipment. Sent free. Write postal for it now. A few notable reductions.

New Herschel-Spillman Motors, 4 and 6 cylinder, \$275; other motors, \$65 up. \$300 fore-door touring bodies now \$85. Runabout bodies 1914 Ford, new \$35; others \$40 and \$50. Runabout tops, \$15; touring, \$25 (measurement blank sent on request); Racing Seats, \$10 each; Spicer Universal joints, \$4 each; mechanical oilers, \$4 up; windshields, \$5 up; Special nickel 1 piece Rain-vision shield, \$10; Disco self-starter, \$5; Remy complete dual system magnetos, Model R. L. and R. D., \$25; others, \$5 up; Rayfield, Stromberg and Schebler carburetors, \$5 up; gloves, \$1 up; double plush robes, \$3.50 each. Bulb horns, 75c; electric horns, complete with wire and button, \$1.95; hand horns (mechanical), \$1.50; exhaust horns (all sizes), \$2.50; spark plug pumps, \$5; double action pumps, \$1.75.

SPARK PLUGS

Special, 5 for \$1; Mosler, 4 for \$1; Timesco, 3 for \$1; Bearings all \$1 up to \$5.

Send for our latest USED CAR LIST, and the supply PRICE WRECKER—it's free.

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1210 Michigan Ave., Chicago
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Sure-Go Ford Fan Belt

Made of web and leather. Web on outside prevents stretching leather on inside. Makes smooth wearing surfaces. Ask the dealer, or send us 50c for sample.

HARPHAM BROS. COMPANY
LINCOLN, NEBRASKA
Manufacturers

"THICK-O GUM SHELLAC"

Absolutely pure Orange Shellac (no rosin), cut very thick and heavy in denatured grain alcohol, put up in double friction top cans. One doz. 1/2 pint, \$1.30, you pay charges. One doz., 1/4 pint, 90c, you pay charges.

THINK OF IT—Shellac positively guaranteed to be cut at rate of six pounds to a gallon.

Princeton Sealing Wax Co.
PRINCETON, ILLINOIS

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\$25.00 to \$250.00

Liberal terms to responsible persons or firms. Write
C. H. BERMO CO., Omaha, Neb.

We Tear 'Em Up and Sell the Pieces

We Can Save You Money on Repair Parts or Supplies for Your Auto

We also buy old autos—condition no object—or any part of an auto, or if you want to trade parts we will trade with you.

MOTORS

Empire 1912, 20 H. P.....	\$ 75.00
Bergdoll 1913, 30 H. P. Unit Power Plant.....	150.00
Jackson 1910, 40 H. P. Unit Power Plant.....	150.00
2 Cyl. Motors.....	\$25.00 to \$50.00
Flanders 20 H. P., 3 speed.....	75.00
Great Smith 45 H. P.....	75.00
Kissel 50 H. P.....	100.00
Stoddard-Dayton 8K 35 H. P.....	75.00

Can supply you with Crank Cases, Crank Shafts, Cam Shafts, Cylinders, Pistons, Connecting Rods, Radiators, Gears (any style), Timers, Magnetos, Coils, Carburetors, Manifolds, Water Pumps, Transmissions, Rear and Front Axles, Wheels, Steering Gears (complete), Steering Wheels, Gasoline Tanks, Wind Shields, Springs, Bodies, Seats and Cushions, Jacks, Tires and Tubes, Head Lamps, Side Lamps and Tail Lamps (any style), Prest-O-Lite and Search Light Tanks, Horns, Mufflers—in fact, any part of an auto.

OUR GUARANTEE TO ALL—IF NOT SATISFIED WITH YOUR BARGAIN, RETURN AND WE WILL REFUND YOUR MONEY.

AUTO WRECKING CO.

Old Church, 13th and Oak
KANSAS CITY, MO.

WHEELS For any car or Truck. New FORD Wheels with 30x3 1/2 Clincher rims, \$2.45 each, net.

MILLAR WHEEL WORKS
2211 S. Michigan Ave. Chicago

PARTS AND ACCESSORIES WANTED

ROWBOAT MOTOR WANTED—Elegant 6 1/2 x 8 1/2 reflex camera (similar to Press Graflex), works to 1-1,800 second, with six double holders in leather case. Sell for \$40 without lens, or will trade for rowboat motor. H. H. Buckwalter, 713 Lincoln, Denver, Colo.

WANT TO BUY

Crank case for Model 16 Buick. Must be in good condition.
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Send for free book and free search plan.
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Established 1864. Main office, Washington

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ALL OUR RADIATOR REPAIRING GUARANTEED. New Radiators, Hoods, Fenders, Tanks and New Cores installed in old radiators at bargain prices.
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The Clearing House—continued.

A New Radiator or Your Old One
repaired. Repairs in one day—a new radiator in two days. We are specialists also on fenders, hoods, gas tanks, lamps and all auto sheet metal work.

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ONLY RADIATOR FACTORY IN NORTHWEST

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RADIATORS REPAIRED,

Leaking and wrecked radiators made equal to new. New cores or any part fitted in any radiator. Hoods, Fenders, Tanks made to order. **GUARANTEED WORK—QUICK SERVICE**

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on automatic machinery by skilled mechanics at prices that will interest you. Gears, axles, valves and parts of all kinds made of high grade alloy steel. Send us your worn or broken parts and we will replace them.

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Crankshafts, Crankcases, Connecting Rods, pistons, scored cylinders made equal to new with our New Silver Iron process—use the same piston and rings.

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Cylinders Rebored and Ground

Fitted with my light pistons and McCadden Leakless Rings.

I produce a cast iron piston weighing as low as 2 pounds for a 4-inch. Every job sent out is from 25 to 40% lighter than factory. Result: Absence of vibration, higher speed, more power. Also put in new pins and bushings. Every piece finished on grinders by micrometer to mirror finish.

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ST. CLOUD, MINN.

CYLINDERS REBORED

Including new pistons and rings, \$7 to \$11 per cylinder. General overhauling and repairing.

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CYLINDER REGRINDING

Including New Pistons and Rings. All makes, \$5.00 per Cylinder. Write

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and fitted with Special Composition heat-treated rings and heat-treated pistons, \$7.00 to \$15.00 per cylinder. Ford cylinders reground and fitted with Standard weight pistons, \$18.00. Special light pistons, \$24.00. Oxy-acetylene Welding.

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Including new pistons and rings for \$5 to \$11 per cylinder. We do this class of work exclusively and are thus able to give you the highest class of work at these prices. Ford cylinders reground, including new pistons, rings and wrist-pins, for \$20.00.

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LEE W. OLDFIELD

Minneapolis, Minnesota
Extra light reciprocating parts and accurate cylinder grinding my specialty.

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Restore the Power and Snap of Your motor by having the cylinders reground, new pistons and rings \$7 to \$11 per cylinder. Ford cylinders reground, new pistons and rings \$15 per set. Oxy-Acetylene Welding. Work guaranteed.

Established 1897

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The Boxill and Bruel Portable Automobile Cylinder Grinder is a big money maker. Should be in every garage and service station. Write today for descriptive circular and prices.

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Furnish our heat treated piston rings and pistons. First class equipment, 15 years' experience. Write for our prices.

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POSITION WANTED as automobile accessory manager, salesmen in store or as a traveling salesman. Can give best of references for any of these positions. Address Box E 323, c/o Motor Age.

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Trucking and Storage. Automobiles and Bodies Stored. Automobiles boxed for export.

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ANNUAL TIRE SALE

In Guaranteed and Used Tires

Size	Used	New	Size	Used	New
30x3	...\$4.50	\$ 6.00	34x4	...\$ 9.00	\$12.00
30x3 1/2	... 6.00	7.80	34x4 1/2	... 10.00	17.80
32x3 1/2	... 7.00	8.75	36x4 1/2	... 11.00	17.80
33x4	... 9.00	11.85	37x5	... 12.00	21.00

10% deposit with order. Balance C. O. D. subject to examination.

ACME TIRE AND REPAIR CO.

1547 Michigan Ave. Chicago, Ill.

AUTO TIRES!! AUTO TIRES!!

Tough tread tires. They average 5000 miles service. 30-3, \$6.50; 30-3 1/2, \$8.25; 32, \$8.35; 33-4, \$11.50; 34, \$12.00; 36, \$12.00. All other sizes. Skids 10% additional. For 4000 mile guarantee add 10%. No money in advance.

TIRE SALES COMPANY, Buffalo, N. Y.

BARGAIN

In new and used tires. Lowest prices in Chicago.

Send for our price list

SERLIN TIRE COMPANY

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MAKE TWO OLD TIRES

Do the work of a new one. Send us two of your old casings, regardless of their condition; by our process we return you the two tires made into one ready for 2000 miles of actual service. We guarantee this mileage absolutely. We are doing it for others. Send us two old tires today, or write and

Ask Us How

COWANS BROS.

150 West 55th Street New York City

The Clearing House—continued.

DOUBLE TREAD YOUR OLD TIRES

Why not reclaim your old worn out or rim cut tires and have from

2,000 to 5,000 MILES MORE USAGE?

Send me two old tires, one with a good bead, the rubber could be all worn off, and the other with a good tread but can be all rim cut or blown out on the side, and we will combine them into a sound one by our

Double Tread Reclaiming System

For a cost of from \$2.00 to \$4.00

If you have only one tire in this shape we can furnish you with the other one at a cost of from \$4.00 to \$9.00. If you have no old tires to have remade you can purchase ready remade ones that we carry in stock. All sizes, from \$4.00 to \$12.00.

Size	Plain	Non Skid	Size	Plain	Non Skid
30x3	5.00	5.50	36x4 1/2	11.00	12.00
30x3 1/2	6.00	7.00	34x3 1/2	7.00	8.00
37x5	11.00	12.00	32x3 1/2	7.00	8.00

For other sizes get our complete price list

LEON JAFFESS

Double Tread Tire Expert

252 West 55th St. NEW YORK CITY

Open Day and Night

Branch: 5904 Central Ave., Cleveland, O.

We pay express charges on receiving your old tires and will send them back C. O. D.

TIRES—Guaranteed 3500 Miles

Heavy Car Type

30x3	7.60	32x3 1/2	11.05	34x4	16.05
30x3 1/2	10.15	33x4	15.70	35x4 1/2	22.20

Deduct 10% and send cash with order

Other sizes in proportion

Consumers Tire Co., Indianapolis, Ind.

TIRES TIRES

All Fresh Selected Seconds

Case	Tube	Case	Tube
30x3	6.00	34x4	12.00
30x3 1/2	7.90	35x4 1/2	17.90
32x3 1/2	8.85	36x4 1/2	18.25
33x4	12.60	37x5	21.00

All other sizes in stock. Non-Skid 10% extra.

All orders C. O. D. on approval.

TIRE SUPPLY COMPANY

1101 Hennepin Ave., Minneapolis, Minn.

Full guarantee on all inner tubes.

Premier Red Tires

Are high-grade low-prices and guarantee 4,000 miles.

Size	Plain	Non-Skid
30x3	6.30	7.20
30x3 1/2	8.60	9.30
32x3 1/2	10.00	10.50
33x4	14.30	15.00
34x4	14.65	15.35

Mail Orders Given Prompt Attention

DEALERS—Write for our special proposition

PREMIER

"The safe investment" Tire sold by leading dealers, or

CENTRAL TIRE CO.

234 N. Broad St. Philadelphia, Pa.

WANTED—AGENTS & SALESMEN

EXCLUSIVE TERRITORY GIVEN TO GOOD AGENTS AND DEALERS

Liberal commission for sale of

CARBON-NOT

The best Carbon Remover on the market. Write for particulars

CARBON-NOT SALES CO.

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To sell Electric Vulcanizer operating on 6 volt storage battery. New idea. Quick seller. Every owner buys. Absolutely guaranteed. Can make \$50.00 weekly. Exclusive territory to producers. CORBETT & DE COURSEY CO. Pittsburgh, Pa.

WANTED—State or county agents to sell Groll Ford Auto Starters. Ford dealers and owners doing big business with the GROLL. The best mechanical starter ever invented.

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AA1 WELDING OF ALL METALS

Cast Iron and Aluminum a Specialty

ADVANCE WELDING MACHINE COMPANY

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Phones: Monroe 3937; Auto. 36-192. Chicago, Ill.

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Expert welders on automobile parts. Manufacturer of the Galbraith Welding Torches.

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Absolutely Guaranteed Welding

We absolutely guarantee all work done by the OXWELD PROCESS of welding and cutting, including welding cracked or defective cylinders, crankshafts, housings, aluminum crank and transmission cases, etc., etc. Estimates furnished on job and contract welding and cutting of all kinds.

OXWELD ACETYLENE COMPANY

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Oxy-Acetylene Welding, Automobile and Machinery Parts

WELDED AND MACHINED

Cracked Cylinders a Specialty

ADAPT MACHINERY CO.

1624 Wabash Ave. Chicago, Ill.

WE DO WELDING

others cannot do on parts of aluminum or cast iron. Expert auto repairmen dismantle and reassemble jobs. Ship your worst smashed crankcases and cylinders to—

HOBBIE'S WELDING PLANT, Hampton, Iowa

MISCELLANEOUS

AUCTIONEER—F. C. BLACKMAN

Conducts sales of new and second-hand automobiles in any State in the Union. Expert operator. Thoroughly acquainted with all makes of cars and accessories; eight years' experience.

517 N. Central Ave., Paris, Ill.

WE SPECIALIZE

in placing and supplying High Grade Technical men in all branches of the Automobile Industry.

THE TOLEDO ENGINEERING AGENCY,

Toledo, Ohio

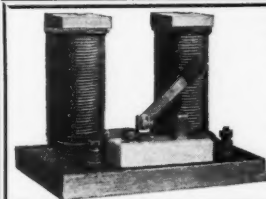
MOTOR AGE CLEARING HOUSE columns offer golden opportunities for disposing of all kinds of parts and accessories.

Note advertisements in preceding pages.

For further particulars address,

MOTOR AGE

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ST. LOUIS MAGNETIZER \$7.50

Recharges all kinds of magnets to original strength from a 6-volt battery.

WRITE FOR PARTICULARS

ST. LOUIS ELECTRICAL WORKS
Arlington & Easton St. Louis, Mo.



UZUM Is it worth anything to you to be able to Wash Your Hands Without Water

When you are out on a trip in your automobile. If your dealer does not carry UZUM send us 15c for full size can. We pay mailing charges.

Agents Wanted

For sale by leading garages, drug, harness, grocery and hardware stores
UNIVERSAL CHEMICAL COMPANY, Indianapolis, Indiana

MAKE YOUR FORD LOOK LIKE THIS

\$65. Fenders Included



Columbia Body Co.

of

DETROIT MICHIGAN



The TRUMP Ring

Increases power; uses less gas; prevents carbon; saves oil. Wherever there's a piston ring—use TRUMP. Guaranteed. Write

TRUMP MANUFACTURING CO., Crown Point, Ind.

The PARISH & BINGHAM COMPANY

PRESSED STEEL FRAMES

Write for Estimates

CLEVELAND, OHIO



SPROCKETS

CHAINS AND DIFFERENTIAL
IN STOCK OR ORDER

SEND FOR NEW CATALOG

Cullman Wheel Co. 1341 Altgeld St. Chicago

"ELEKTRA Brake Lining saved us that time"



In emergencies you've got to "call for help" on your brake linings. Upon the responsiveness of your brakes depends the safety of your car and its passengers. A good brake lining is simply good insurance. Consider it as such by getting the best obtainable—

ELEKTRA ASBESTOS FRICTION BRAKE LINING

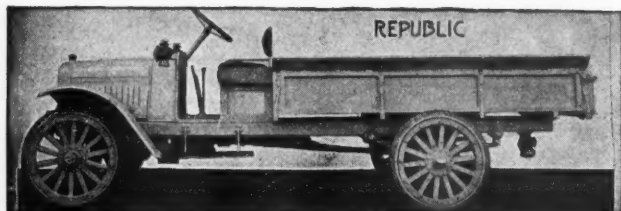
Made of selected asbestos, chemically combined (by a patented process) with an indestructible metal, and offering a very high coefficient of friction. That is why it will not burn, char, or slip; why oil, water or vapor have no effect upon it.

In point of wear and service, it has no superior.
Write for sample and complete information.

THE F. L. HORTON MFG. COMPANY

Whittier Street

Boston, Mass.



3/4-Ton Model

Republic Motor Trucks

*The Fastest Selling Line of Motor
Trucks in America*

3/4-ton with express body, internal gear drive	\$ 995.00
1-ton chassis	1350.00
1 1/2-ton chassis	1475.00

The Vitals of the Republic

1 and 1 1/2-TON MODELS

Continental Motor	Russell Full Floating
Timken Axles	Jack Shaft
Bosch Magneto	Covert Transmission
Stromberg Carburetor	Standard Cone Clutch
	Firestone Tires

No Better Units Built

We ask the opportunity to prove our statements.
Wire or write for catalog and complete information.

Republic Motor Truck Co., Alma, Mich.

Index to the

Allen Auto Specialty Company.....	95
Atwater Kent Manufacturing Works.....	82
Auto Parts Company.....	85
Automobile Construction and Engineering Co.	75

Bearings Company of America.....	69
Blood Brothers Machine Company.....	83
Bosch Magneto Company.....	3
Boston Starter.....	80
Braender Rubber and Tire Company.....	81
Brietson Manufacturing Company.....	84
Brown Company.....	80

Champion Ignition Company.....	Cover
Champion Spark Plug Company.....	45
Clearing House.....	87 to 93
Columbia Body Company.....	93
Columbus Varnish Company.....	78
Connecticut Telephone & Electric Company.....	50
Continental Motor Manufacturing Company.....	80
Corcoran Lamp Company.....	83
Cullman Wheel Company.....	93

Dayton Engineering Laboratories Company..	62
Dodge Brothers.....	73
Dort Motor Car Company.....	4
Double Seal Tire Valve Company.....	83
Dyneto Electric Company.....	61

Eisemann Magneto Company.....	85
Electric Auto-Lite Company.....	86
Electric Spark Appliance Company.....	74

Fisher Electrical Works.....	86
Ford Motor Company.....	80
Fulton Company.....	85

Gabriel Horn Manufacturing Company.....	77
Garford Manufacturing Company.....	86
Gould Storage Battery Company.....	70
Gray & Davis, Inc.....	Front Cover
Grossman, Emil, Manufacturing Co., Inc.....	83
Gulf Refining Company.....	86

Heinze Electric Company.....	82
Hess-Bright Manufacturing Company.....	65
Holley Brothers Company.....	81
Horton, F. L., Manufacturing Company.....	94
Houk, George W., Company.....	81
Hyatt Roller Bearing Company.....	67

Inter-State Motor Company.....	86
--------------------------------	----

Johns, H. W.,-Manville Company.....	68
-------------------------------------	----

K. W. Ignition Company.....	79
Kimball Tire Case Company.....	80
King Motor Car Company.....	56
Kissel Motor Car Company.....	63
Kokomo Electric Company.....	84

Leece-Neville Company.....	85
Lewis Spring and Axle Company.....	60
Lexington-Howard Company.....	81
Locomobile Company of America.....	Back Cover
Lovell-McConnell Manufacturing Company...	55

Advertisements

Manzel Brothers Company.....	72
Master Carburetor Company.....	81
Mayo Manufacturing Company.....	84
McQuay-Norris Manufacturing Company.....	Cover
Metz Company.....	79
Miller Rubber Company.....	82
Moline Automobile Company.....	96
Mutty, L. J., Company.....	86

National Can Company.....	84
National Motor Vehicle Company.....	78
New Departure Manufacturing Company.....	2
New York and New Jersey Lubricant Company.....	85
Nordyke and Marmon Company.....	53

Oakes Company.....	57
Oxygen Generator Company.....	76

Parish and Bingham Company.....	93
Paro, H. G.....	95
Perkins-Campbell Company.....	82
Picard, A. J., and Company.....	83
Pittsburgh Model Engine Company.....	78
Platt and Washburn Refining Company.....	1
Prest-O-Lite Company.....	85
Pumpelly Battery Company.....	47

Rajah Auto Supply Company.....	83
Rayfield Carburetor.....	66
Republic Motor Truck Company.....	94
Republic Rubber Company.....	83
Royal Equipment Company.....	85
Rupe and Kemp.....	84
Rutenber Motor Company.....	85

Salisbury Wheel and Manufacturing Company.....	82
Schrader's, A., Son, Incorporated.....	82
Scripps-Booth Company.....	76
Seng, W. P.....	74
Service Motor Supply Company.....	80
Shaler, C. A., Company.....	82
Sheldon Axle and Spring Company.....	48
Simplex Short-Turn Gear Company.....	86
Sparks-Withington Company.....	64
Speer Carbon Company.....	78
Sphinx Motor Car Company.....	86
Splitdorf Electrical Company.....	54
St. Louis Electrical Works.....	93
Standard Oil Company.....	52
Stewart Accessories Company.....	82
Stewart Motor Corporation.....	59
Stewart-Warner Speedometer Corporation.....	51
Stromberg Motor Devices Company.....	80

Texas Company.....	58
Trump Manufacturing Company.....	93
Twitchell Gauge Company.....	79

Universal Chemical Company.....	93
Universal Trailer Company.....	79

Van Sicklen Company.....	71
--------------------------	----

Warner Gear Company.....	77
Weed Chain Tire Grip Company.....	75
Westcott Motor Car Company.....	84
Weston Electrical Instrument Company.....	80
Wheeler and Schebler.....	46
Willard Storage Battery Company.....	49
Winton Motor Car Company.....	83

Zenith Carburetor Company.....	84
--------------------------------	----

The ALLEN TIRE CASE

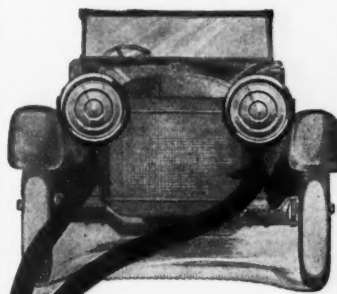
The result of the protection afforded a spare shoe by a perfect fitting, waterproof tire case is measured in actual mileage when the shoe is put in service. The patented Allen Tire Case is guaranteed waterproof, perfect fitting and of finest workmanship. Made of highest quality enamel duck, in several styles and in all colors and all sizes. Prices \$3.00 and up.

Ask your dealer to show you the Allen Tyrometer, the handy, accurate tire pressure gauge. Price \$1.00.

The Allen Auto Specialty Co.
MANUFACTURERS

1926 Broadway
New York

1627 Michigan Ave.
Chicago



Something New From Europe

From Switzerland comes the latest and best in headlight aids—KLEARGLOW. Its popularity throughout Europe has proven its merit.

This new appliance is made of scientifically designed corrugated glass surfaces in one piece. Permits touring in the country without removal, as must be done with dimmers, so as to light the dark, uneven roads sufficiently. "Dimmers" are dangerous—KLEARGLOW is safe. For city driving KLEARGLOW is 100% efficient—gives you *all* the power of the lamps without that dangerous glare. Use

KLEARGLOW The Auto Light Diffuser

Fits any car and improves its appearance.

The law regulating headlights is strict. You can drive where you like with KLEARGLOW attached to your lamps, and *know* that you are conforming to all statutes covering this vital point.

Avoid accidents to yourself and others—damage to car—arrests and fines—by installing KLEARGLOW in place of your present headlight glass. You can try KLEARGLOW for fifteen days before purchasing if you wish. Our illustrated folder telling all about KLEARGLOW and our liberal free trial offer will interest you. Write for a copy today. Address

To JOBBERS and DEALERS:

We have some interesting data regarding KLEARGLOW and its business-building possibilities for you. Just say, "Send the folder," on a post card. We'll do the rest.

H. G. PARO

766 Michigan
Boulevard Bldg.
Chicago, Ill.



Moline-Knight "40"

The First Light Weight, Low Priced, Knight Motored Car

Starting over a year ago, our engineers began to develop the new light weight Moline-Knight 40. They have created a remarkable car, weighing 2896 pounds when ready for the road—a light, snappy, powerful car that holds the road at high speeds.

The new Moline-Knight 40 has created an instantaneous impression. Those who have seen it and ridden in it pronounce it an unusual value. It is one of the season's best sellers.

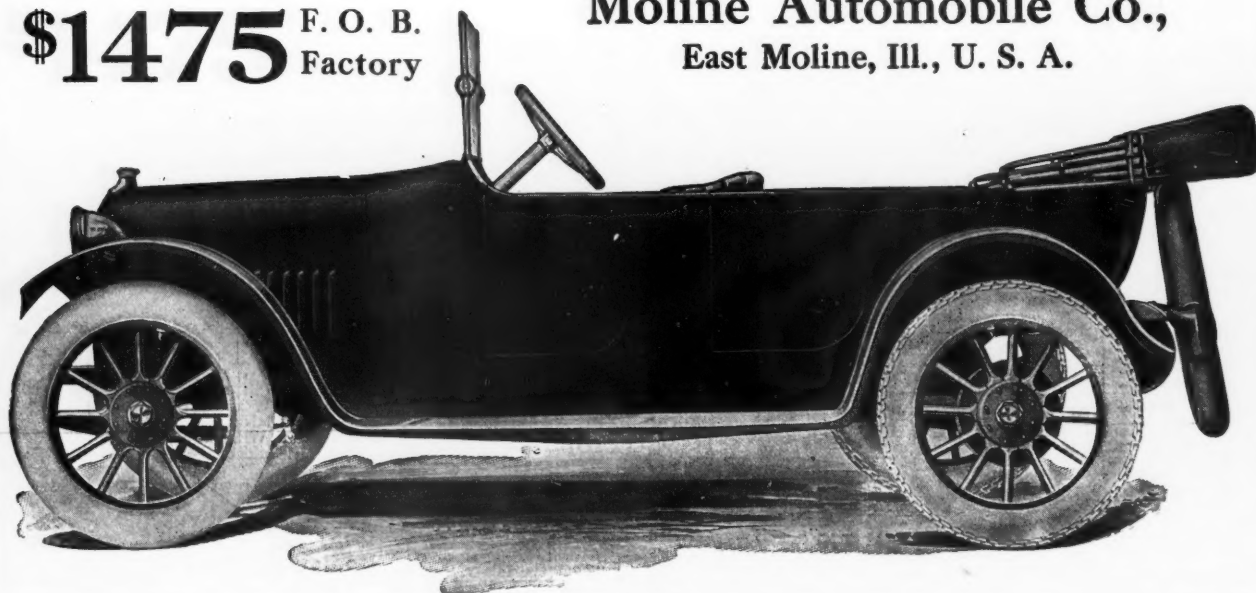
Dealers from coast to coast are rallying around the Moline-Knight 40. They see in this light weight sleeve valve motored car, one that will be a

money maker for them, one that is destined to fill a long felt want on the part of buyers and one that will build a permanent trade, because a Moline-Knight owner never returns to the poppet valve motor.

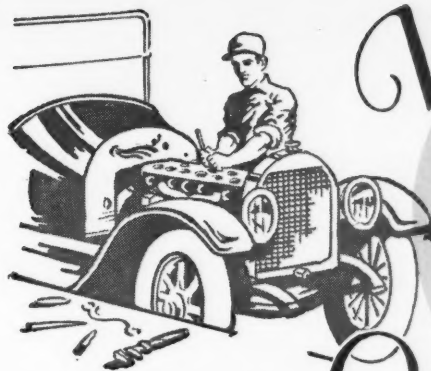
Each week new dealers are added to the ever increasing Moline-Knight list of distributors. If you are located in territory not yet contracted for, write for complete information, or better still, come to the factory where you can see the car and our method of building. There are men in your territory who will buy either a Moline-Knight 50 at \$2500 or a Moline-Knight 40 a \$1475.

\$1475 F. O. B.
Factory

Moline Automobile Co.,
East Moline, Ill., U. S. A.



Look for the name **LEAK-PROOF** stamped on the Ring



When You Have Your Car Overhauled

Don't Forget to Have the Piston Rings Examined

☛ All the overhauling in the world won't bring the power of your car back to proper standard if the piston rings in the motor are faulty and are allowed to remain so.

☛ Why pay for overhauling unless you really remove the cause of power loss? Poor compression—fuel waste—carbon trouble and excessive motor wear will only persist and increase, because all such conditions are due to inefficient piston ring service, and replacement is the only way to correct them.

☛ Even if they haven't yet occurred, they are inevitable if one-piece, unequal-bearing piston rings are installed in your motor. Now, when your engine is down, is the time to save yourself from trouble in the near future.

☛ Tell the repair man to put in

MADE IN
ALL SIZES

LEAK-PROOF

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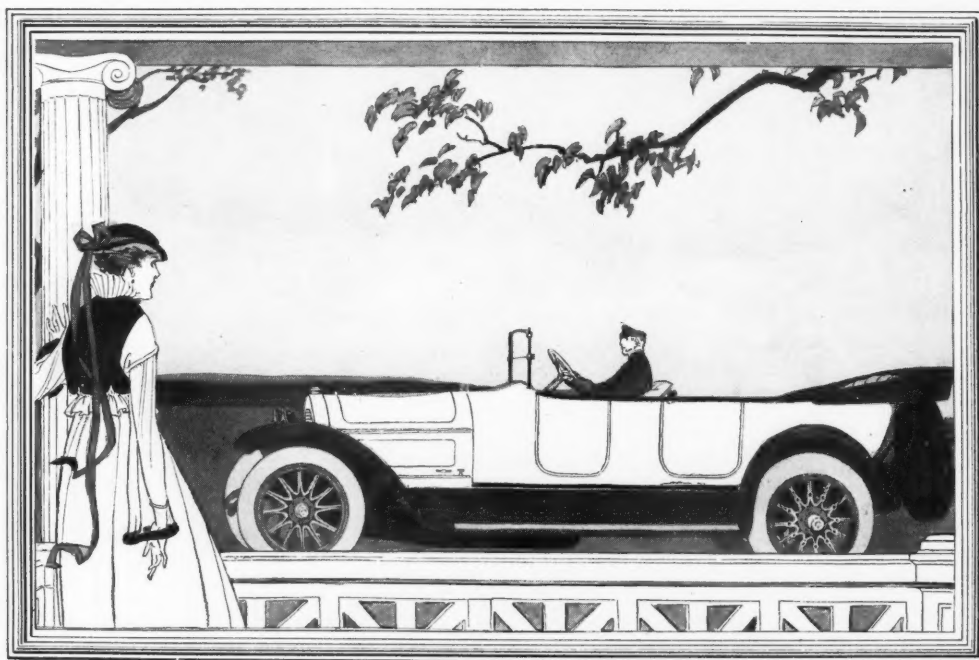
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